THE VETERINARY RECORD

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888

No. 14. APRIL 7, 1951 VOL. 68.

MINERAL NUTRITION OF THE DAIRY COW *

BY

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BRITISH GLUES AND CHEMICALS LTD.

The whole subject of mineral nutrition has assumed an increased importance in recent years. Certain aspects of the subject have received attention in many periodicals and scientific papers, but I propose to survey the position as I see it, in the short time at my disposal, particularly as it affects the dairy cow. I hope to emphasise certain points previously not considered fully.

In order to preserve a measure of perspective we should note initially that the total mineral content of farm foods varies from only 1·3 per cent. in maize, through oats 3·1 per cent., oil cakes 5 to 6 per cent., dried yeast 10·8 per cent., to fish meals and meat and bone meals at 25 to 30 per cent. It is usual to classify feeding-stuffs into two main groups: (*a*) grass, hay, silage, kale, etc., (*b*) cereal meals, oil cakes or simply concentrates, the former usually making up the maintenance ration and a small part of the production and the latter almost entirely concerned with production. It is essential that these two groups of food be considered together and not in isolation. All too frequently in the past only one or two ingredients have been examined. Our interest lies in how much calcium or how much phosphorus, for example, goes over the cow's throat in a given period, not just how little calcium is taken in via unsupplemented concentrates, or how much phosphorus is contained in a foodstuff which may be rarely used.

Before we examine typical rations for major mineral element content in some detail it will be advantageous to give some figures for the requirements of the dairy cow for calcium and phosphorus. Now there is here a very interesting story, not widely known, which has influenced mineral supplementation to a marked degree. This story starts way back in 1864 when a German chemist named Hennenberg, as a result of certain crude experiments and estimations, stated the calcium and phosphorus requirements of the cow as follows:—

	Calcium (Ca)	Phosphorus (P)
Maintenance (1,000 lb.) per day	30 g.	9·6 g.
Per gallon of milk	10 g.	8 g.

These figures have been religiously copied by many writers in the intervening years and even are to be found in "Rations for Livestock," Bulletin No. 48 published by the Ministry of Agriculture (1948), and in the 1950 edition of "Animal Nutrition and Veterinary Dietetics" revised by John T. Abrams. Recent balance experiments on cattle in the United States indicate that the above-mentioned calcium maintenance requirements are set at an unreasonably high level and can safely be reduced to one-third. Figures which I propose to take and which are to a large extent accepted by nutritional authorities (Morrison, 1948; Green, 1948) as safe and reliable are as follows:—

	Calcium	Phosphorus
Maintenance (1,000 lb.) per day	10 g.	10 g.
Per gallon of milk	10 g.	10 g.

The dairy cow has naturally a considerable need for salt, but minimum needs are undoubtedly very low. There is no store in the animal as with calcium and phosphorus, thus a regular supply is needed. One per cent. of salt added to the grain or concentrate ration takes care of normal needs.

I have purposely devoted some time to these figures as I propose to relate the animal's requirements to the amounts of the mineral elements supplied in feeding-stuffs.

Hay, Grass Silage, Kale, etc.—These foods predominate in the first group referred to and much could be said in relation to their mineral make-up. Broadly speaking, they are excellent sources of calcium and supply moderate to poor amounts of phosphorus. This content is varied by weathering, fertiliser treatment and botanical composition. Hay is, after all, the staple diet of a large number of animals, and with others forms a major part of the ration. It may be as well if we consider some of the extremes as well as average figures of the mineral composition of hay. Through the good offices of Mr. A. H. Simm (N.A.A.S., Reading) I have obtained a few examples from Berkshire and Oxfordshire. These have been picked at random and read as follows:—

		Ca %	P %			Ca %	P %
Berkshire	1	0·76	0·27	Oxon	7	0·60	0·16
	2	0·67	0·19		8	0·45	0·19
	3	0·40	0·15		9	0·45	0·15
	4	0·53	0·21		10	0·51	0·21
	5	0·72	0·18		11	0·25	0·15
	6	1·46	0·25		12	0·29	0·17
Average		0·76	0·21			0·42	0·17

A 15 lb. (Maintenance Allowance) of No. 6 (Berkshire) provides at least 95 g. of calcium and 16 g. of phosphorus, enough calcium for maintenance and 8 gallons but only enough phosphorus for maintenance and ½ a gallon. The hay poorest in calcium (No. 3) still provides enough for maintenance and 1½ gallons. Smith and Comrie (1947) examined 62 samples of seeds hay in the Lothians of Scotland and here again the mineral content varied appreciably. The average was 0·39 per cent. calcium and 0·18 per cent. phosphorus with a range of 0·25 to 0·75 per cent. for calcium and 0·11 to 0·27 per cent. for phosphorus. Rye grass predominated in these samples and one can note particularly *that 15 lb. of the hays* poorest in phosphorus provided only about 7·5 g. P, and the average about 12 g. P. Ling and Smith (1939-40) in the South West have also shown that hay is in many cases

* Presented to the Royal Counties Division, N.V.M.A. at Oxford, November 24th, 1950.

poor in phosphorus and relatively rich in calcium. Of 75 samples their analyses record as follows:—

	Calcium (%)		Calcium in grammes per 15 lb. hay	Phosphorus (%)		Phosphorus in grammes per 15 lb. hay
Average ...	0·91	=	62 g.	0·21	=	14 g.
Highest ...	1·54	=	104 g.	0·29	=	19·5 g.
Lowest ...	0·63	=	42 g.	0·14	=	9·5 g.

By way of summarising the figures from all these investigations I have prepared a graph combining four analyses; this shows in equivalent quantities of hay, the trend of mineral intake. With any increase in total content it is the calcium status which rises most markedly.

	Calcium (%)	Phosphorus (%)	Ca/P ratio
Hay No. 1	0·21	0·11	1·9 : 1
Hay No. 2	0·63	0·14	4·5 : 1
Hay No. 3	1·00	0·28	3·6 : 1
Hay No. 4	1·50	0·30	5·0 : 1

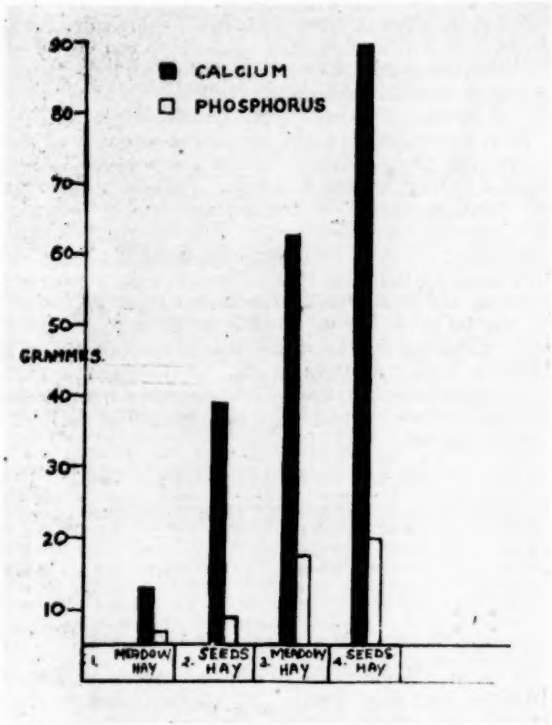

Fig. 1.

Professor Sheehy showed many years ago that stock utilised the minerals much more efficiently from good hay than from bad hay. We can only conclude that there is in most instances a surplus of calcium from the maintenance ration, whereas the phosphorus supply is much less certain and there is no surplus. Kale feeding, for example, would also enlarge the surplus of calcium.

Cereals and Concentrates form the second group of feeding-stuffs. As a class they are seriously deficient in calcium and if animals were maintained exclusively on this type of diet a serious calcium deficiency would arise. However, this aspect hardly ever occurs in this country to-day. The phosphorus level varies (0·4 to 1·0 per cent.) in individual foods. When soyabean meals, cotton cake, bran, dried yeast predominate then the supply is excellent, but if palm kernel, ground nut, maize gluten, dried beet pulp are substituted then the supply is a much poorer one. The latter position predominates to-day; indeed, the phosphorus content of concentrates has probably fallen about 30 per cent. since pre-war to around 0·4 to 0·5 per cent. P. These foods are poor in salt and additional amounts must be fed.

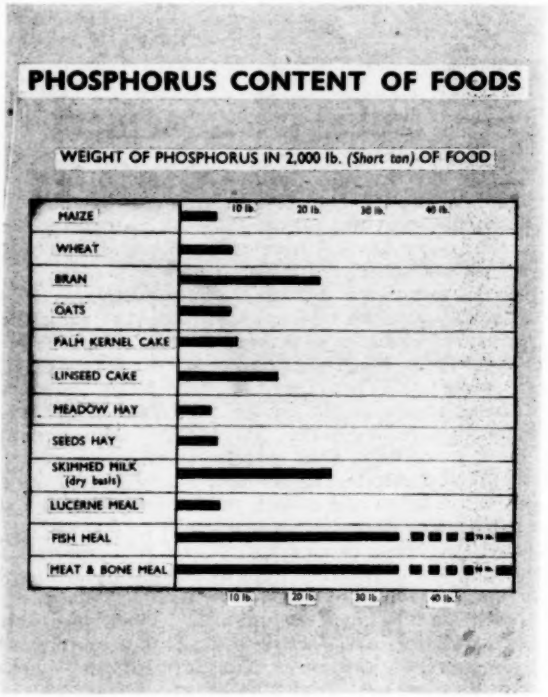

Fig. 2.

National Compounds.—From the beginning of the war (and since) the Ministry of Food have controlled the manufacture of all animal feeding-stuffs. These controls have prescribed certain minimum and maximum levels for calcium carbonate and sodium chloride. The latter lie at the present time between a minimum of 1 per cent. and a maximum of 1·5 per cent. salt (NaCl); both are reasonable figures.

The calcium figures call for some comment and the present levels are a minimum of 1·5 per cent. $CaCo_3$ (=0·6 per cent. Ca) and a maximum of 2·5 per cent. $CaCo_3$ (=1·0 per cent. Ca). Prior to June 10th, 1949, a much higher level of inclusion was permitted, namely, 2·0 per cent. $CaCo_3$ minimum, and 3·5 per cent. $CaCo_3$ maximum, with the proviso, if you please, that at least 1·5 per cent. of calcium carbonate as such must be included.

I mention these last details because these amounts can still be included in National Cattle Food No. 4—the steaming up ration for autumn calvers—and because of historical interest. They emphasise, in my view, the fact that there is still a good deal of loose thinking in relation to the amount of calcium required by the milking cow. They further reflect a very prevalent but erroneous view that high calcium feeding controls milk fever. What do these figures

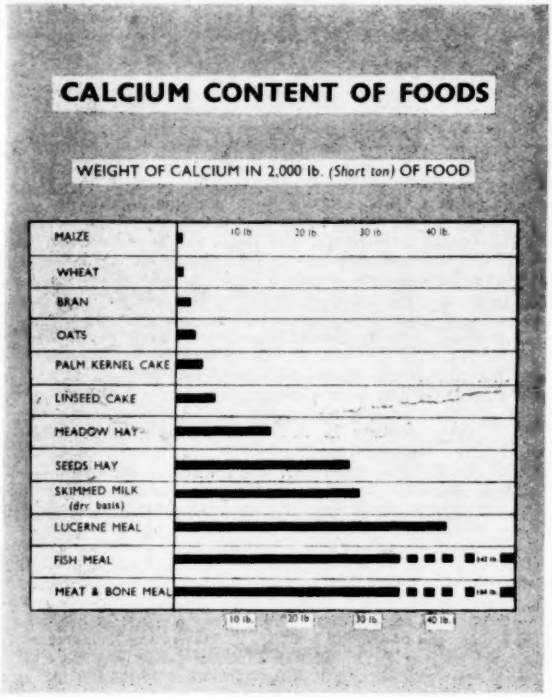

FIG 3.

mean in terms of feeding? Are they in keeping with the standard we have agreed upon? I revert in this instance to my method of comparing quantities supplied in a given unit of food with amount required. Let us take 4 lb. or a 1 gallon portion.

	Calcium		
	Min.	Max.	Requirement
Present figures for National Cattle Food No. 1. 4 lb. provides	10·5 g.	18·0 g.	10 g.
Old figures for National Cattle Food No. 4. 4 lb. provides	14·4 g.	25·0 g.	10 g.

The old figures (and National Cattle Food No. 4) were, of course, unnecessarily high, while the present levels are much more in keeping with known requirements. However, the *less usual* minimum levels are probably quite high enough when combined with many of the hay samples and maintenance rations fed concurrently. The phosphorus content of compounds arises in some cases only from the naturally occurring ingredients, there being no minimum figure for phosphorus prescribed by the feeding-stuffs order. Milling offals and phosphorus-bearing oil cakes are no longer plentiful. It can be stated from an examination of many types of ration fed to-day that if additional minerals are required it is the calcium phosphate, rather than calcium carbonate, supplement which is required. This view is held also by Dr. John Duckworth, of the Rowett Research Institute, who, writing recently in the journal *Farming*, states: "The use of feeding limestone as a mineral supplement should be discontinued and that of feeding bone flour substituted."

A few remarks on the subject of trace elements will not be out of place following extensive consideration of the calcium-phosphorus picture.

Iodine.—Much interest has centred around this element since the early experiments at the Rowett Research Institute. While there do not appear many instances of gross deficiency there are possibly minor shortages in certain areas. Recent experiments in Devon and Cornwall by Iodine Educational Bureau, London, with iodine fed at 120 mg. K. I. per cow per day indicate that conception rates have improved with this treatment.

Cobalt.—Cereal grains are probably very low in cobalt and any shortage will be emphasised where their use is extensive and where home-grown foods predominate. Few cases of cobalt deficiency in cattle have been recorded, but in sheep there are many areas affected.

Manganese.—A deficiency of this element was suggested many years ago as a cause of infertility, but, to my mind, its importance has been grossly exaggerated. However, I would be glad to see new data.

Copper.—Bovine copper deficiency was first suspected in 1946, but since that date surveys of the blood copper status of dairy herds in England and Wales have revealed a variety of disorders associated with copper deficiency. Copper estimations of food are at present uninformative. We shall probably have to use a good deal more copper among our cows in the future.

The main method of increasing the supply of the major mineral elements or of improving their balance is by the use of lime and phosphatic and potassic fertilisers. In a limited way fish meal and meat and bone meal can help. These practices, although sound, have their limitations and a mineral supplement can prove to be the key to many problems. The most usual method is the incorporation of 2 to 4 lb. of the supplement in any concentrates that are fed. This method meets normal needs and is recommended. The direct feeding of the loose mixture itself on a "free access" basis to grazing cattle in suitable boxes or troughs is very useful where land values do not justify fertilisation or where no concentrates are available.

By way of conclusion, I would like to make brief reference to only one or two conditions where we have found that additional food minerals are helpful or where we would be glad of the opinion of those present. From a mass observation standpoint and also from one large-scale experiment of a controlled nature we have found that sterility or infertility of a nutritional non-infective type can be materially reduced by a "complex" high phosphorus trace element supplement. In regard to lactation tetany, grass staggers or more correctly hypomagnesaemic tetany, I am prepared to sit on the fence. There are, as you are no doubt aware, two schools of thought on this matter. One regards the high magnesium supplements as of little value, while the other goes nearly as far as saying they are definitely prophylactic. Perhaps members would relate their experiences. Ketosis has been connected with mineral imbalance both in Canada and Scandinavian countries. This has stimulated some thought here and personally I have had some success with the use of cobalt sulphate orally in this condition. I know that certain veterinary surgeons record the same indications in certain areas.

There is much still to be learned on this subject and one can only speculate on the interactions and relationships which may be unfolded in the future. It is probable that minor shortages are of greater importance than the rarer clear-cut gross deficiencies. There has been a strong tendency in the past to rely on either analyses of the animal's food or on the analysis of blood—both may be misleading.

The response of the animal, either in improved breeding or better condition, is probably the best criterion as to whether additional minerals are required.

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Discussion

Mr. S. L. Hignett, in opening the discussion, congratulated Mr. Bond on his paper and expressed general agreement with his views. He disagreed, however, with Mr. Bond's standard for phosphorus intake—for higher fertility, maintenance standard should at least be doubled and the production standard increased by about 50 per cent. Mr. Hignett went on to describe the symptoms of iodine deficiency in cattle—the cows and heifers did not "bag up" properly before calving. Many calves, especially heifer calves, were born dead at full term. Some had enlarged thyroids. He had found iodine deficiency in herds where there was a gross Ca/P imbalance either way. It could be produced experimentally by feeding excess phosphorus. A copper deficiency produced a peculiar and characteristic feel of the skin—a crackly feeling, and the animal was hindbound. The hair, especially around the eyes, became bleached. Blood estimation was useless in confirming the condition, and the examination of a liver biopsy should be resorted to. The application of phosphates to grassland did not materially increase the phosphorus value of the herbage, but the calcium content was increased. It was much better to apply potash. Mr. Hignett said that the Ca/P ratio of some samples of lucerne hay that he had examined was much wider than that of other samples from land which had been managed better. The application of potash would greatly improve the Ca/P ratio of some crops. He asked Mr. Bond whether the feeding of magnesium would increase the butterfat content of milk as had been suggested in the agricultural press. Was zinc an element of importance to cattle? Had Mr. Bond any ideas on the factor, at present unknown, which prevented copper absorption by the ewe in "swayback" areas?

Mr. Bond, in reply, said that trials were in progress, but there was no evidence to show that the feeding of magnesium affected either the butterfat or the solids-not-fat content of milk. He had no knowledge of a zinc deficiency affecting cattle. With copper deficiency there appeared to be a factor affecting the copper utilisation—the identity of the factor was not known, but it appeared to be in the food. This factor was present in hay and could be transported from one place to another, *viz.*, the swayback experiments undertaken at Weybridge with hay from Derbyshire. The liming of ground might bind up copper in some unexplained manner on certain soils and in certain areas.

Mr. F. R. Spratling asked whether rock salt was of any use. Did weathering affect the mineral content of hay, or was the species of herbage more important? He cited the case of a Jersey herd in which the incidence of milk fever increased following the installation of a water softener. The incidence returned to normal some time after the softener had been removed. Some farmers, he said, claimed that the liming of pastures reduced the incidence of milk fever. In reply, Mr. Bond remarked that rock salt was very useful for supplying salt but of little use in any other respect. The principal impurity was marl. The species of herbage had more influence on mineral content of hay than did weathering.

Mr. E. P. Barrett quoted the case of a farm on which the feeding of minerals containing magnesium markedly reduced the incidence of hypomagnesaemia. He asked how much iodine should be given in herds where an iodine deficiency was suspected and also enquired whether a top dressing was useful for lucerne. Mr. Bond, replying, confirmed that 120 mg. potassium iodide per head per day was used in Devon, and Mr. Hignett agreed—but added that, on occasion, he had used double this quantity with good effect. Mr. Hignett recommended as a top dressing for lucerne, 3 cwt. superphosphate and 2 cwt. muriate of potash per acre.

Mr. D. L. Stewart said there was no doubt that the amount of calcium and phosphorous supplied in the diet of cattle at the present time differed greatly from that in the pre-war diet, but that he was not convinced that this change in any way affected animal health in general, or could produce herd infertility. In his area the system of ley farming—which tended to promote a wide Ca/P ratio—was very prevalent, but the incidence of herd infertility was comparatively low. He asked Mr. Hignett the total number of cows involved in his observations and urged him to publish all the facts. Were there any experimental trials to confirm Mr. Hignett's theory, as he could not accept the deductions unless backed by more adequate data and experimental evidence? Mr. Hignett replied that 938 cows were used as the basis for his work, and a chemical analysis had been made of all feeding-stuffs. Pressure of work had prevented him from publishing more data. Feeding experiments were in progress, but, with a limited intake of heifers each year, it would be a long time before the trials were completed and could produce any conclusive results either way.

Mr. F. W. Withers said that in his opinion infertility was widespread and the problem urgent.

Mr. D. N. Spriggs asked about the availability to the animal of minerals in the diet and whether calcium borogluconate fed daily to cattle would help to prevent milk fever. In reply, it was said that about one-third to one-half of bone flour fed would be absorbed—but that this would depend on various factors, such as sunlight. There did not seem to be any particular value in a soluble calcium salt fed daily to prevent milk fever as the condition appeared to arise on diets adequate in calcium and was possibly connected with hormone imbalance.

Mr. S. J. Edwards asked Mr. Bond whether the Ca/P ratio in silage was the same as that in the ingredients from which it was made, and whether the process of preparation altered the availability of these elements. He wondered whether the hyperkeratosis of the skin and the hairlessness which occurred in a condition known in the U.S.A. as "X" disease—a disease of unknown aetiology, but believed to be due to a deficiency of trace elements—might be a copper deficiency. He thought that Mr. Hignett's work was a real stimulus towards an appreciation by the profession of the place of mineral elements in animal health. It remained to explore the true significance of the Ca/P imbalance in the causation of bovine infertility, and, no doubt, Mr. Hignett later would have the opportunity of confirming his field observations by the results of experimental trials. In reply, it was said that the silage Ca/P ratio was the same as that of the ingredients, and, as far as was known, the availability was unaltered. Silage tended to be deficient in vitamin D and this might be important in herds where silage was fed to the exclusion of hay. A copper deficiency produced a bleaching of the coat and not a hairlessness.

Mr. A. Brownlee asked whether cattle should be fed on a standard quantity of minerals all the time. He had conducted experiments on animal behaviour and had found that their liking for various minerals would change; also that young cattle liked copper sulphate diluted 1 : 10 with kaolin; and that they appeared to have a greater liking for phosphorus than for calcium. Mr. Bond agreed that the mineral taste did vary, but in a recent experiment at Shinfield and in their own experiments it had been noted that salt bricks containing a variety of trace elements were rejected in favour of bricks containing phosphorus (feeding bone flour).

Mr. G. H. Arthur said that he found it difficult to relate the Ca/P ratio in the diet with the blood levels. In women, calcium could be withdrawn from the bones in pregnancy to produce osteomalacia—but pregnancy was still maintained. Mr. Hignett, in reply, said that infertility as a result of a phosphorus deficiency might be produced as follows—excess calcium in the ration interfered with the metabolism of phosphorus. Calcium in the body was readily mobilised—phosphorus was not. Most of the calcium was excreted as calcium phosphate, and, if there was insufficient phosphorus in the blood, some would be drawn from the tissues. Any stress might affect the anterior pituitary and so upset the production of gonadotrophic hormones—first luteinising hormone and later F.S.H. In phosphorus-deficient areas in Ireland anoestrus and suboestrus were produced before any bony changes were found.

FESTIVAL LIVESTOCK

Mr. D. J. Carpenter, of Swingfield, Dover—a journalist who writes on a wide variety of agricultural and allied topics—is responsible for the livestock section in the Country Pavilion at the Festival of Britain, in which most breeds of British livestock will be shown from May to September. Through the co-operation of breed societies and leading breeders, many outstanding animals will be sent to the South Bank site. The exhibit is designed to attract overseas visitors in particular, and should do much to help the export drive.

THE VETERINARY RECORD
April 7, 1951

PRE-PARTUM MILKING

PRE-PARTUM milking is a custom which is being practised in a number of herds and an abstract of a communication concerning the habit appears on another page. There is some controversy as to its value and some doubt as to its effect on the new-born calf. The reason advocated for this practice of milking a cow before the birth of the calf is to relieve the pressure and congestion in the udder so that the gland may remain in a condition sufficiently healthy for its task during the ensuing months. The vogue may be necessary in animals which have been fed richly during the immediately preceding period, and udders which become enlarged and pendulous may have their shape conserved. The possibility of an increased lactation yield is said to be of secondary importance.

Experimental proof of its value or danger is not yet sufficiently extensive to enable clear-cut opinions to be expressed or unequivocal advice to be given to the dairy industry; at the moment it remains a problem. Some influence is likely to be exerted on the calf, as in ruminants the early secretion from the udder appears to be beneficial. During the later stages of pregnancy the udder contains a fluid which is rich in globulins and in antibodies against bacteria which are pathogenic for the calf, and which has been recognised as essential for the newly born animal. Although the nature of the protective mechanism of colostrum is still disputed there is no argument as to the value of this substance. The evidence is increasing that the protection afforded is of a specific immunological nature and therefore contingent on the calf remaining for a short while in the same environment as the mother. There are also grounds for the belief affirmed in the article abstracted and elsewhere, that the pre-partum secretion contains a high level of globulins which decrease markedly when the cow has been subjected to a long period of milking before the birth of its calf. At the time of calving the secretion appears to have less of the characteristics of colostrum both in its globulin and antibody content. When calves are reared in the same locality as their mothers, they are protected by natural events against the hazards which they may encounter, and colostrum is the main vehicle of defence. Change the environment, remove the excess of globulins and antibodies from the udder, or deprive the calf of its colostrum and adversity threatens. When we know that pre-partum milking is without danger, then we can advise accordingly, but, until then, it may be a dangerous procedure to flout the natural protective mechanisms merely to acquire a doubtful economic advantage.

In the Dail recently Mr. Jas. Dillon, Eire Minister for Agriculture, rejected the 1,000 or 1,200 gallon cow as the most suited to dairying in Eire and favoured the 500 to 800 gallon animal. He would never guarantee a price for milk based on the 300 gallon cow. He proposed to distribute thousands of approved young heifers this year to take the place of uneconomic cows. Farmers could go to a depot at Grange, Co. Meath, and take a choice from 800 in-calf approved heifers in exchange for an inferior cow.

* * * * *

Both H.R.H. Princess Elizabeth and the Minister of Agriculture, Mr. Tom Williams, are to visit Harper Adams Agricultural College, in Shropshire, on June 8th, when the college celebrates its jubilee year. The college was officially opened in 1901 by the Minister of Agriculture at that time, Mr. Hanbury.

CLINICAL COMMUNICATIONS

BONE FRACTURES IN THE LARGE ANIMALS

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Recent correspondence has demonstrated a laudable interest in the possibility of salvaging some of the casualties in horses and cattle suffering from fracture of the limbs. For a number of reasons immediate destruction is the usual method of disposing of such cases. The veterinary surgeon agrees to this drastic measure because, except in the simplest of cases, much pain will be suffered in transporting the injured animal to suitable premises. He recognises, too, the inadequacy of the known splinting techniques to retain the fractured bones at rest in opposition to the power of the massive muscular development of these large animals. The end result of prolonged and laborious treatment would very probably be failure. If a horse is not completely normal when recovered he is unfit for work—99 per cent. success is failure. Even if intended to lead the indolent life of a recluse in a paddock or as a breeding animal, severe lameness would be a great affliction.

Improvement in the treatment of fractures in the small animals will encourage investigation of the use of such appliances as the Stader and Kirschner-Ehmer type splint, medullary pins and bone plates in fractures in the horse and ox. We know that such fractures have been treated, but records are not available as to successes and failures.

As foundation knowledge for such investigation it is important that information should be gained of the type of fracture to be expected in the individual bones of these large animals. A small collection of such specimens has been acquired from steeplechasing and flat-racing accidents.

Four humeral fractures are shown (Fig. 1). These were the result of racing accidents and demonstrate the profound comminution that takes place throughout the shaft of the bone and the extension of the fracture line through the upper or lower articular surface. The femoral fracture (Fig. 2) shows similar widespread comminution and again involvement of the articular head. In addition to these few specimens, others in the veterinary museum of the Liverpool University but of unknown history show similar fragmentation and joint damage.

It may be that such gross comminution of these high, medullated limb bones is usual in racing accidents and would be due to the extreme indirect violence induced by the speed at the time of accident. In addition, further dispersal of the fragments and spreading of the joint fracture will take place in the attempt to recover and during the inevitable fall. Neighbouring muscles, vessels and nerves suffer in like degree. The rapid swelling in the area, even within a few minutes, is at times surprising.

The source of the trauma damaging these heavy and powerful bones is probably always indirect combined with inco-ordinate muscular action. Excepting at their extremities the humerus and femur are very heavily muscled and direct violence from kicks and such trauma is unlikely. Direct violence upon the subcutaneous extremity of the femur at the stifle joint and the humerus at the elbow joint are very liable to involve the articular surface. That such injuries can heal is evident from specimens to be seen in the museums. In these cases, in which the animal has made a degree of recovery as the result of sentimental reluctance to destroy or of neglect, the bones show much capricious union of fragments, some being firmly fused and

A. C. SHUTTLEWORTH : Bone Fractures in the Large Animals

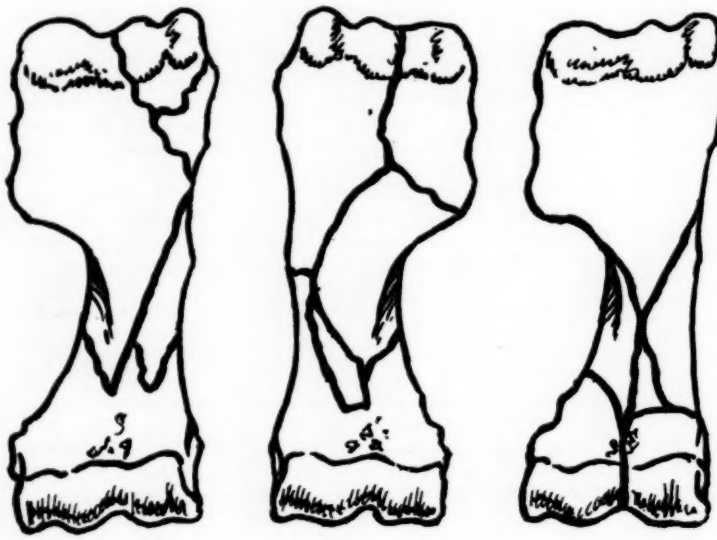

Fig. 1.—Humeral Fractures.

Fig. 2.—Femoral Fracture.

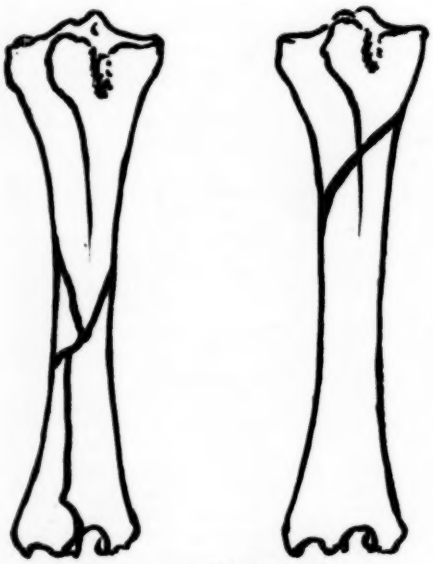

Fig. 3.—Tibial Fractures.

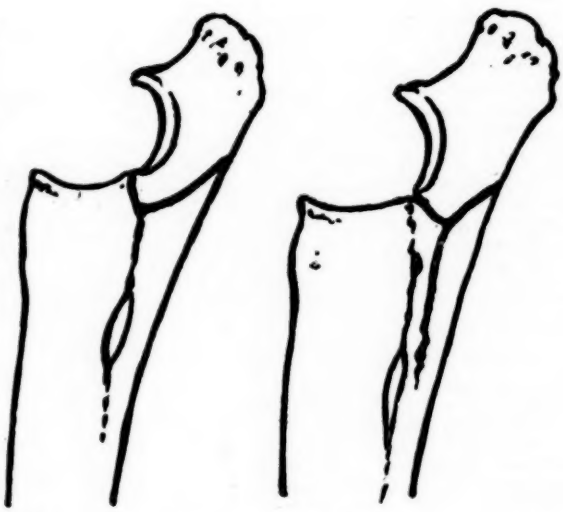

Fig. 4.—Ulnar Fractures.

Fig. 5.—Metacarpal Fracture.

others showing signs of mere fibrous union. Bone infection and osteomyelitis is common. These animals could only have been extremely lame and incapacitated.

In femoral and humeral fractures, X-ray examination of the bone is impracticable. To gain information of the extent of the bone injury and joints involved widespread exploration would be necessary. Control of the fragments by any device at present known would be extremely difficult and arduous for both surgeon and patient. Upon economic and ethical grounds it is very doubtful whether treatment of any fracture of these high limb bones would be permissible.

In the tibial fractures pictured (Fig. 3), both of which were the result of racing accidents, one shows fragmentation again and with the joint involved in addition. This would be regarded as hopeless as the joint was very disrupted. Nevertheless, other tibial fractures seen, including the second example in the diagram, are uncomplicated and treatment would appear to be feasible under good circumstances.

Radial and ulnar fractures are most frequently the result of direct injury following from kicks. As with the tibia the shafts of these bones are quite exposed to such damage, being unprotected by muscular masses over quite large areas. Such fractures are characterised by their simple nature. Two ulnar fractures are shown (Fig. 4) and both are simple cracks and were probably undisplaced in the first stages. One was certainly the result of a kick and the other in some doubt, having occurred during a steeplechase fall. Decision to destroy was not made until some few days following the injury. Both horses were, of course, extremely lame and showing pain and swelling about the olecranon, but no crepitation. Radiography showed the type of injury. Nothing active could usefully be done and within a week it was evident that the olecranon had become displaced forward by the weight and pull of the triceps. The joint was ruined and the horse was destroyed. Such cases as these might well have been subject to treatment by means of mechanical control of the fragment such as plating or Stader-type splint.

A split metacarpal bone (Fig. 5) was the only case in which treatment was undertaken and did well with no more than gypsona splinting. This example and numerous split pastern cases demonstrate that a horse can cope with a fractured leg for a long period. The metacarpus and metatarsus are admirably adapted for close control of a fracture and good results might be expected, provided joint injury and displacement has not occurred.

I consider the treatment of the humerus and femur should not be considered for the reasons previously given, but I see no reason why shaft fractures of the tibia, radius, ulna, metacarpus and metatarsus should not be treated in both the horse and the ox if suitable appliances and technique can be devised and the lay mind be educated to accept it as likely to be successful.

Weekly Wisdom

In all things throughout the world, the man who looks for the crooked will see the crooked, and the man who looks for the straight will see the straight.—John Ruskin.

* * * * *

A small delegation of the Milk Marketing Board will visit Holland and Denmark in the early part of May to study particularly the technical and administrative problems connected with the payment for milk to producers, having regard to butter-fat content. This will be in the nature of an investigation into the practical problems involved in this system, and the delegation will report to the Board on its return.

OESOPHAGEAL RUPTURE IN THE BOVINE

J. DRUMMOND DUNN, M.R.C.V.S.,

AND

D. H. W. BROWN, M.R.C.V.S.,

Wadebridge, Cornwall

Case 1 (J. D. D.), December 26th, 1950.

Subject.—Two-and-a-half-year fat Devon heifer, three months pregnant.

Symptoms.—Gas was present in the subcutaneous tissues from the brisket up to the mandibles and extending to below the base of the ear on each side, giving the animal the appearance of wearing a " ruffle."

There was no bloating of the rumen; the animal stood with the forelegs abducted, but could walk with little difficulty. It showed an interest in food, chewing hay but not actually swallowing.

The temperature was 102° F.; the respirations were normal in rate but accompanied by a slight grunt.

Rupture of the oesophagus was suspected and the animal slaughtered.

Post-mortem *Examination.*—A rent about 5 inches long was found in the oesophagus between the upper and middle thirds. There was a considerable amount of clotted blood and ingesta in the adjoining tissues.

Case 2 (D. H. W. B.), December 30th, 1950.

Subject.—Two-year-old fat Devon heifer.

History.—The owner reported that, after eating frosted mangolds, the heifer was badly blown, having previously vomited up several pieces. When questioned, he denied using any form of probang.

Symptoms.—All the usual symptoms of bloat were exhibited.

Respirations were laboured, with a definite " roar " on inspiration.

The angles of both jaws were completely obliterated by gas in the subcutaneous tissues, this extending from the base of both ears to about 8 inches down the left jugular furrow.

Rupture of the oesophagus was suspected and slaughter advised.

Due to the late hour (9 p.m.), trochar and cannula were used and the animal slaughtered next morning.

Post-mortem *Examination.* — The oesophagus was lacerated about 6 to 8 inches below the epiglottis, the tear being approximately 6 inches in length.

Very little blood was found in the adjoining tissues, but portions of rumenal contents were present.

Remarks.—We record these two cases because of their unusual nature in our experience, the fact that we encountered them within five days of each other, and also because, so far as we are aware, there is a lack of reference in the literature to the occurrence of the condition in the bovine, especially in regard to a description of the symptoms.

We were not able to determine the specific cause of the rupture in either case, but both fed outdoors on mangolds which were frosted.

Both carcases, incidentally, passed for human consumption.

A body to be known as the United Kingdom Dairy Association has been formed, to deal entirely with all matters connected with the International Dairy Federation. Chairman of the Council will be Earl De La Warr and representatives will be drawn from 15 organisations.

ABSTRACTS

[(*a*) **Pre-partum Milking.** *Mss. from Royal Agricultural College, Cirencester.*

(*b*) **Milking Before Calving.** *Agriculture.* **57.** 351–358. Hill, R., Widdowson, R. W., & Maggs, B. E. (1950.)]

The first of these is a manuscript of 32 pages dealing with the nature of the secretions obtained in pre-partum milking and the possible effect of these secretions on the calf. The second is the abbreviated account which was published in *The Journal of the Ministry of Agriculture.*

The milking of cows before calving has become almost a routine practice in some herds and the reason advanced is the relief of pressure in the udder; it is likely to be necessary only in those animals which have been well "steamed up." The authors review the literature on the subject and give data of their own observations on eight farms. Samples of secretion were taken at some of the farms; they were taken at intervals from the first pre-milking to the birth of the calf, the difference in time being from about ten to 12 days to 12 hours before calving. There was a great variation in fat according to breed and no conclusions could be drawn; the casein content dropped but did not, at parturition, reach that figure which is considered normal for milk. The greatest change occurred in the amount of globulin, for whereas the secretion 12 days before calving might contain as much as 20 per cent., it was sometimes as low as 1·27 per cent. at parturition. The carotene content varied greatly in the different breeds and the trends observed were similar to those of globulin. The nature of the secretion obtained at calving varied according to the time pre-milking had occurred; those pre-milked longest tended to give secretions approaching normal milk at calving.

Calves born of the cows which were pre-milked were reared satisfactorily; 76 of a total of 175 heifer calves were observed and they appeared to suffer no deleterious effect. A discussion ensues as to the health of the calf and the factors which are known to be important in the nutrition of such young stock. It is pointed out that colostrum is important to the well-being of the calf, but that its virtue may be due to its antibody content, its vitamin A or its ability to form a soft curd in the stomach of the calf. The results of the investigation here recorded do not support the contention that pre-milking causes scour, unthriftiness or death of calves. It must be emphasised, however, that the farms on which the observations were made "have enjoyed an almost peculiar freedom from calf scours, but they were not chosen on this basis." It is stated that the small amount of non-fatty fraction of colostrum which has been found to be of service in protecting calves is easily supplied by the milk at parturition, as the secretion from pre-milked cows contains sufficient for the purpose. There being no evidence that pre-milking affects the subsequent lactations, the incidence of mastitis or milk fever, the authors are led to the following conclusions: that cows and heifers did not appear to have suffered in any way from pre-milking and that pre-milking may be carried out without detriment to the calf or its dam.

R. L.

[Morphological and Ethological Notes on a Hybrid Between a Domestic Duck and a Domestic Goose. Poulsen, H. (1950.) *Behaviour.* **3.** 99–104.]

The hybrid described, apparently only the second on record, was obtained from a farmer by the Copenhagen Zoological Gardens. The parents were a wild-coloured domestic duck (male) and a white parti-coloured domestic goose (female). At the farm where the hybrid was reared the stock of breeding ducks and geese consisted of an old drake and two ducks and a young gander and two geese. The drake was the dominant bird and never allowed the gander into the pond where it would normally have copulated. It was for this reason that the drake was able to copulate with the geese in spite of the presence of the gander.

The hybrid had the superficial appearance of a duck, but on closer examination showed points in common with both parent species. The neck was short and curved, as in ducks. The wings were rather long, reaching to the end of the tail, as in geese, but were narrower than in geese. The tarsus was reticulated, as in geese, but the scutes were arranged in a row along the front as in ducks. The bill was higher at the base than in ducks. The nostrils resembled those of geese and there was a wide goose-like nail on the tip of the under-bill. The transverse ridges were placed on the insides of the upper and lower jaws, as in ducks, but were intermediate in shape between the thin ridges of ducks and the tooth-like knots of geese. The edges of the eyelid were feathered, as in ducks, but were thick and orange-coloured, as in geese. The iris was bluish-grey, as in the dam.

The bird ate grass in goose-like fashion but used only the tip and not the sides of its bill. When swimming, it quacked like a duck. It dominated other birds, irrespective of their size. The male copulatory-organ could be seen, but the bird showed no tendency to mate even after the injection of large doses of testosterone. It is suggested that it did not possess the nervous mechanisms necessary for the somewhat elaborate courtship display of either species.

A. N. W.

BRITISH ASSOCIATION'S MEETING IN EDINBURGH

The Duke of Edinburgh, the third member of the Royal Family to be President of the British Association for the Advancement of Science, will deliver his inaugural address on "The British contribution to science and technology in the past 100 years" at the opening session of the Association's 113th annual meeting in Edinburgh on the evening of August 8th.

Immediately before his Presidential Address there will be a special graduation ceremonial at which the Duke will receive from the University of Edinburgh the Honorary Degree of Doctor of Laws. Previous Royal Presidents were the Prince Consort, at the Aberdeen meeting in 1859, and the Duke of Windsor (then Prince of Wales) at the Oxford meeting in 1926.

This year's Edinburgh meeting—the sixth to be held in the city—has been planned to form part of the Festival of Britain and a large number of items in the programme will be concerned with the contributions made by British science since 1851. But, as Sir Harold Hartley, F.R.S. (Chairman of the Council), said recently at a Press conference, when he represented the President, the meeting would not only look backward; many subjects of great topical interest would be discussed.

* * * * *

Samples.—Dr. D. Hanbury, of Midhurst, Sussex, writes: I hope that I shall not be considered lacking in gratitude by the donors if I write to you to record my increasing concern at the enormous numbers of samples of proprietary drugs I receive. The ingenuity of the dispenser, the cunning of the manufacturer of fancy packings, and the erudition of those obscure pamphleteers who write the accompanying advertisements amaze me no less than the exotic names of those mentioned in the bibliographies at the end. . . .—*British Medical Journal.*

REVIEW

[The Right Way to Keep Pet Fish. By Reginald Dutta, B.A., F.Z.S. Foreword by H. F. Vinall, Curator, London Zoo Aquarium. Pp. 152 + numerous illustrations and index. "Right Way Books" series: Published by Andrew George Elliot, Glade House, Kingswood, Surrey. Price 6s. net.]

Probably many veterinary surgeons, in company with the reviewer, will feel a great relief that here is a book which can be recommended to the rapidly increasing numbers of amateur aquarists. With the exception of those few who are themselves aquarists veterinary surgeons, particularly urban and suburban practitioners, frequently are embarrassed by questions concerning fish management and ailments, in reply to which they must confess ignorance.

The reviewer is in no way competent to assess the technical accuracy of the information given in this book, but the author obviously provides in practical and readable manner an excellent grounding for the would-be or novice aquarist. Aquaria, ponds, foods, plants, management, breeding and buying of stock are all amply discussed. The book is concluded by a section describing the various exotic fish, tropical and cold water, giving adequate detail for the reader to form an opinion of the characteristics and habits of the types he has it in mind to obtain.

The chapter which discusses ailments leaves one with the feeling that the author cannot go much deeper into the causes of the diseases described than the average veterinary surgeon. Are there no scientific data on fish diseases available? The treatments advocated are obviously empirical but have the virtue of being practicable and the therapeutic agents recommended seem likely to be reasonably safe. The frequent exhortations as to sterilisation of hands and equipment call for approbation and the wish that other small livestock hobbyists would follow the excellent advice given in this book regarding avoidance of transmission of infection.

EDUCATIONAL TRAVEL

Since 1946 endeavours have been made under the auspices of the National Council of Social Service to develop facilities for inexpensive educational travel. In 1948 Youth Travel Ships, Ltd., was established, with the support of numerous organisations, to bring international travel within the reach of all young people who wish to travel for educational purposes.

Ship Travel.—American youth travel interests are now ready to charter the *Charlton Star* or similar ship to make a series of voyages between Britain and U.S.A. this summer, 1951. It has been provisionally arranged to make five voyages from Britain to U.S.A. between May and September, and five voyages from U.S.A. to Britain between June and October. The cost per passenger from this country will be from £50 to £65 return, according to position of berth on the ship. Meals are included.

Air Travel.—There will be air travel by chartered planes this summer to and from America for students and others. A schedule is planned for flights from London to New York in June and July and from New York to London in August and September. The inclusive cost per passenger by air will be £43 single or £86 return, with food during flight.

It will be of interest to Europeans who have no means of obtaining dollar credit in U.S.A. that, besides the facilities for buying American rail tickets in pounds sterling, it is hoped to provide temporary seasonal employment in U.S.A. to cover expenses whilst in the United States of those who are taking part in these educational visits.

Enquiries should be addressed to Youth Travel Ships, 7, New Square, London, W.C.2. "We need to advise the Americans of the number of prospective passengers as soon as possible," writes Mr. Gregory Welch, the Acting Secretary, "so an early response is of great importance to the success of the enterprise."

REPORT

[Northern Rhodesia: Annual Report of the Department of Veterinary Services for 1949.]

The policy of the department as outlined in para. 1 of the report is: "To protect the livestock industry and to foster its growth and productivity to meet territorial requirements of livestock products."

In implementing this policy the duties of the staff have consisted of:—

(*a*) Disease control and prevention.

(*b*) Active encouragement of improved methods of stock management.

(*c*) Research work on endemic diseases.

(*d*) Controlling and assisting importation of livestock.

The livestock population of the country numbers 878,599 cattle, of which 145,166 are European owned, 117,111 sheep and goats, 40,480 pigs and 357 horses. It is satisfactory to record that the cattle population showed an increase of 80,000 on last year's figures; but even with this increase the country is still not self-supporting in meat supplies, for we read in the report that nearly 18,000 slaughter cattle were imported from Bechuanaland and nearly 500 tons of chilled and frozen meat from S. Rhodesia.

Animal health was very satisfactory on the whole. The territory remained free of contagious bovine pleuropneumonia, and foot-and-mouth disease did not occur during the year. The prevalence of rabies is causing concern and tuberculosis among cattle is proving to be more widespread than formerly was suspected.

Tuberculin testing was carried out on a considerable scale and among 6,032 cattle tested in one reserve 2 per cent. reacted. It would be of more than statistical interest if particulars could be given of the type or breed of native cattle that was mainly infected. In other parts of Africa it has been found that certain local breeds are more susceptible to tuberculosis than others, *e.g.*, Ankole cattle in Uganda and Adamawa cattle in Nigeria.

East Coast fever was kept in check in the two infected areas by regular dipping. Other tickborne diseases were similarly controlled. In this connection it is worthy of mention that in the experiments on the use of benzene hexachloride dipwashes action was very satisfactory for seven months, but during the eighth a heavy crop of bont and bont-legged ticks appeared and cases of heartwater occurred. There is now a tendency among farmers to revert to the use of arsenical dips, primarily on the ground of cost and secondarily on the ground of efficiency.

Large-scale vaccination was carried out against anthrax and blackquarter in the areas where these diseases had been prevalent in the past. Over 200,000 doses of anthrax vaccine and 42,000 doses of blackquarter vaccine were issued by the laboratory. Vaccines and remedies were also issued against fowl typhoid, fowl pox, horse sickness, contagious abortion, calf paratyphoid and trypanosomiasis.

Research

Mr. J. W. Macaulay, Senior Veterinary Research Officer, has written an interesting account of the research work which he and his staff carried out during the year.

Dealing with trypanosomiasis, his experiments proved:—

(*a*) That cattle showed no ill-effects from being exposed on five separate occasions to the infection of *T. congolense* and each time cured by intravenous injections of dimidium bromide given at the rate of 1·25 mg. per kg; rather they

developed some resistance to that particular strain of infection.

(*b*) That a strain of *T. congolense* can become resistant to the action of dimidium bromide if infected animals are treated with sub-therapeutic doses of the drug, and this resistance can develop to the extent that the parasites can withstand the drug at three times the minimal therapeutic dosage.

(*c*) That a strain of *T. congolense* rendered resistant to dimidium bromide can be effectively dealt with by doses of antrycide at the rate of 4·4 mg. per kg.

Antrycide.—Preliminary experiments in the use of this drug as a prophylactic showed that animals can be rendered resistant to infection for a period of nearly six months.

Rabies.—In the preparation of anti-rabies vaccine Mr. Macaulay found that chloroform was not a suitable agent to use to inactivate the virus in pulped brain tissue, at least under the climatic conditions of Northern Rhodesia. Vaccine prepared in this way was found to be infective even after it had been stored at refrigeration temperature for six weeks, although it had failed to infect test mice 14 days after manufacture. Subsequent batches of vaccine with the virus inactivated by exposure to 1 per cent. solution of phenol and incubated for 24 hours at 37° C. proved to be satisfactory.

The full extent and intensity of the incidence of rabies in Africa is becoming more and more evident with increasing opportunities for its detection. There is no doubt that the disease is widespread throughout Africa and no territory seems to be free from this terrible disease.

The disease is of little, if any, economic importance and almost the sole interest in its control and eradication lies in its danger to human in-contacts; but that menace is very real and calls for effective measures of control instituted on a wide basis. A policy of large-scale vaccination of domestic dogs coupled with the wholesale destruction of uncared for and unwanted dogs might after a few years, if carried out on a pan-African basis, make a definite and worthwhile impression on the present high and increasing incidence of the disease and bring it eventually under control.

Mr. John Hobday, the director, and the staff of the department are doing good work in implementing in so efficient and practicable a manner the broadly and soundly based policy of the department.

W. W, H.

PLAN FOR QUALITY BASIS MILK PAYMENTS

Addressing the Scottish Section of the Society of Dairy Technology, Professor H. D. Kay, Director of the National Institute of Da'rying Research at Reading, entered a p'ea for payment for milk on the basis of nutritional quality.

Remarking that it was unfortunate that we looked to high butterfat content and not also to a high standard of solids-not-fat, Professor Kay outlined a formula of payment on keeping quality and on total solids, in addition to butter-fat. Under this scheme the keeping quality of milk would be tested 12 times in each half-year, February-July and August-January. There would be three categories—A, which would receive the full price even if there was one failure in the half-year; B, which would lose 1d. per gallon, and C, which wou'd lose 2d. per gallon. These categories would be based on the previous six months' supply.

In respect of total solids there would be six testings in the half-year. A total of 12·3 per cent. would merit the full price; if more than 0·2 per cent. above there would be an extra 1d. per gallon and if 0·2 per cent. below a loss of 1d. per gallon on the standard price.

Mr. J. B. Douglas, Chairman of the Scottish M.M.B., said that payment on a quality basis involved enormous adm'nistration problems. He thought the formula Dr. Kay had produced was just and reasonable if it could be applied.

NOTES AND NEWS

Diary of Events

Apr. 7th.—Annual Dinner of the B.R.X. Club, at the Royal Veterinary College, Camden Town, N.W.1.

Apr. 9th and 10th.—Annual Congress of the Laboratory Animals Bureau, in the University of Liverpool.

Apr. 11th.—Meeting of the Scottish Branch, N.V.M.A., at Glasgow (George Hotel, 235, Buchanan Street), 2.15 p.m.

Apr. 11th.—Special Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, London, W.C.1, 2 p.m., to be followed by a meeting of the Editorial Executive.

Apr. 11th, 12th, and 13th.—Meetings of Committees and Council, R.C.V.S. at 10, Red Lion Square, London, W.C.1.

N.V.M.A. Meetings in London

Monday, April 16th:
2 p.m. Organising Committee
4 p.m Parliamentary and Public Relations Committee.
Tuesday, April 17th:
10 a.m. Veterinary State Medicine Committee.
12 noon Home Appointments Committee.
2.15 p.m. General Purposes and Finance Committee.
Wednesday, April 18th:
11 a.m. Council

Apr. 18th.—Meeting of the Section of Comparative Medicine, Royal Society of Medicine, at 1, Wimpole Street, London, W.1.

Apr. 18th.—Meeting of the Royal Microscopical Society, Tavistock House South, Tavistock Square, London, W.C.1, 5.30 p.m.

Apr. 19th.—Meeting of the Society of Practising Veterinary Surgeons, at the Department of Animal Pathology, Milton Road, Cambridge, 2.15 p.m.

Apr. 19th.—Meeting of the Herts and Beds Veterinary Society at Luton (The George Hotel), 7.30 p.m.

Apr. 19th and 20th.—Meeting of the Association of Veterinary Teachers and Research Workers (Northern Region) at Newcastle-on-Tyne. (See Notice.)

Apr. 20th.—Meeting of the Mid-West Division, N.V.M.A., at Bristol (Berkeley Café, Clifton), 2.15 p.m.

Apr. 28th.—Annual General Meeting of the Association of State Veterinary Officers, at the Royal Veterinary College, London, N.W.1, 2 p.m.; Annual Dinner, at the Criterion Restaurant, Piccadilly, 6.30 p.m.

Sept. 23rd-29th.—Sixty-ninth Annual General Meeting and Congress of the National Veterinary Medical Association, at Eastbourne.

R.C.V.S. Examinations

Wednesday, May 2nd.—Animal Management Examination commences at London.

Thursday, May 10th.—Entries for D.V.S.M. Examination due.

Tuesday, May 15th.—Pharmacology, etc., Examination (Revised Syllabus). Written Examination.

Thursday, May 17th.—Pharmacology, etc., Examination (Revised Syllabus). Orals and Practicals (London and Dublin).

Thursday, June 7th.—D.V.S.M. Written Examinations commence at Edinburgh.

Monday, June 11th.—D.V.S.M. Oral Examinations commence.

Thursday, June 21st.—M.R.C.V.S. Written Examinations.

Friday, June 22nd.—M.R.C.V.S. Written Examinations.

QUARTERLY MEETINGS OF COUNCIL AND STANDING COMMITTEES N.V.M.A. DURING 1951

N.V.M.A. Meetings in London
[*See above*]

The following dates are given for remaining meetings this year, chiefly to give members plenty of time to reserve hotel accommodation.

In Edinburgh

Wednesday, July 11th:
11 a.m. Home Appointments Committee.
2 p.m Organising Committee.
4 p.m. Parliamentary and Public Relations Committee
Thursday, July 12th:
11 a.m. Veterinary State Medicine Committee.
2 p.m. General Purposes and Finance Committee.
Friday, July 13th:
11 a.m. Council.

OUR ADVERTISEMENT "INSET"

An Explanation

A number of letters have been received from members of the Association complaining of the practice of inserting advertising material in the body of the journal, particular exception having been taken to the "splitting" of a scientific article on the first occasion when the inset was re-introduced in the first issue of the year, after a long interval. It has been agreed, with reluctance and after prolonged deliberation, that the practice of using insert advertisements should be continued; also that our readers should be made acquainted with the facts upon which this decision was based.

For a long period, but of late with an alarming acceleration, there has been an increase in every item of printing costs—of paper, type-setting and block-making, to mention the main aspects. To meet these the obvious course has been taken of increasing advertisement rates periodically, but the Editorial Committee felt that it could no longer ignore the additional revenue obtainable by taking advantage of the readiness of advertisers to pay increased rates for space opposite reading matter such as is afforded by the inclusion of an "inset." No one concerned with the appearance of the journal cares to see advertisements in the middle of the text, but the practice has been adopted as a matter of financial necessity by a number of periodicals of high standing, while assurance can be given that in future there will be no interference with the continuity of articles.

* * * * *

Further Successful R.C.V.S. Prosecution

At Woolwich Police Court on Thursday, March 29th, 1951, Michael John Mullally described as formerly of 4, St. Margarets Terrace, Plumstead, was convicted in his absence of practising veterinary surgery contrary to the provisions of section 5 of the Veterinary Surgeons Act, 1948, in that he was an unqualified person.

The Magistrate found the case proved and fined Mullally £20 with 10s. costs, or alternatively two months imprisonment.

* * * * *

PERSONAL

Appointment in the University of Glasgow Veterinary School

Mr. Sydney Jennings, M.R.C.V.S., has been appointed Senior Lecturer in Surgery and Obstetrics in the Clinical Department. Mr. Jennings, who is 45, was educated at Warwick School and qualified as M.R.C.V.S. at the Royal (Dick) Veterinary College, Edinburgh, in 1932. For the next 13 years he was in general practice at Knowle, Warwickshire, and relinquished this to join the Staff at the Royal (Dick) Veterinary College as Senior Lecturer in Medicine in 1945. He has been on the Board of Examiners of the Royal College of Veterinary Surgeons for the Final Year since 1944.

He will be taking up his new appointment at the end of the present academic year.

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Marriage.—Briault—Thompson.—At Carisbrooke, Isle of Wight, on Saturday, March 31st, 1951, Michael O'Meara Briault to Patricia Anne Thompson, only daughter of Mr. and Mrs. A. Thompson, of Newport, Isle of Wight.

Hill—Slack.—On March 24th, 1951, at All Souls Church, Witten, Birmingham, Kenneth G. Hill, B.V.SC., M.R.C.V.S., only son of Mr. and Mrs. Hill, of Farnworth, Widnes, to Gwenda Vera, daughter of Mr. and Mrs. R. C. Slack, of Aston, Birmingham. Among those present were Messrs. F. T. Williams, M.R.C.V.S., and L. N. Owen, B.V.SC., M.R.C.V.S.

. . . . .

Mrs. Else Falster Olsen, Dyrtaegeboligen, Olstykke Station, Sjaelland, Denmark, would welcome enquiries from girls who would like to visit Denmark and, as members of the family, assist with housework and the caretaking of children in the home of a veterinarian at a farm in North Zeeland near Copenhagen (one hour by train). A small salary will be paid.

R.C.V.S OBITUARY

Carus, Alexander, 6, Wiltshire Avenue, Burnley. Graduated Liverpool, July 7th, 1947. Died March 24th, 1951, at Edinburgh Royal Infirmary; aged 25 years.

Keane, John Sylvester, O.B.E., Lieut.-Col. R.A.V.C. (retd.), 20, Parkview Court, S.W.6. Graduated Glasgow, July 7th, 1916. Died March 27th, 1951.

McDougall, William Allan, D.S.O., F.R.C.V.S., Lt.-Col., R.A.V.C. (retd.), of Jedbrae, Jedburgh. Graduated N. Edinburgh, May 30th, 1889; Fellowship May 16th, 1908. Died February 17th, 1951.

Mr. Alexander Carus, M.R.C.V.S.

An Appreciation

Professional colleagues and friends of Mr. Alec Carus will be deeply grieved to learn of his sudden death in Edinburgh Royal Infirmary on March 24th, at the age of 25.

Mr. Carus, who was resident in Burnley, was always keenly interested in animals and on leaving Clitheroe Grammar School in 1942 entered Liverpool University where he qualified in 1947.

He then took up an Assistantship in his home town and during this time his professional ability and engaging manner earned the goodwill of the clients of the practice.

After further short Assistantships in other parts of the country, to widen his experience, his interests turned to Veterinary Preventive Medicine and in October, 1950, he entered upon the D.V.S.M. course at the Royal (Dick) Veterinary College, which course he was unfortunately unable to complete owing to his sudden illness.

His friendly nature and ready smile, so well known to his fellow graduates and colleagues, endeared him to all those with whom he came in contact.

All his life he was deeply fond of music and was an accomplished pianist.

His many friends in the profession will wish to express to his parents their deepest sympathy in their sudden bereavement; Alec was their only son and will be greatly missed in his home.

W. W. B.
J. K. S.

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V.V.B.F. LADIES' GUILD

Dumfries and Galloway Division Dinner-Dance

A dinner-dance in aid of the Victoria Veterinary Benevolent Fund Ladies' Guild was held under the auspices of the Dumfries and Galloway Division, N.V.M.A., in the George Hotel, Penrith, on March 2nd, 1951. A large gathering of veterinary surgeons and their friends from Cumberland, Westmorland and the South of Scotland made the evening a very enjoyable one and, as a result, £85 has been sent to the above fund. The arrangements were made by Mrs. J. Reid, Carlisle, and Mr. John Barr, Penrith.

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GOVERNMENT EMPHASIS ON MEAT PRODUCTION

On Thursday of last week the results, so eagerly awaited by the farming community, were announced of the annual farm price review by the Ministry of Agriculture. The revised payments indicate the Goverment's view that future production requirements include a projection to 1954-5 of a rising output of meat and the stabilisation of that of milk and eggs approximately at present levels, while confirming that the national requirement for home-grown stuffs for animal feeding is virtually unlimited. The emphasis now to be placed on meat is reflected in the proportionately higher price increases for fat stock and wool. To assist milk producers in appropriate cases to switch to the rearing or fattening of cattle, substantial increases have been applied to the prices of fat cows.

On the other hand, the special stimulus previously given to milk production, it is stated, can now be relaxed and the new price has been fixed accordingly. The approximate average pool price for April, 1950—March, 1951 (including quality premiums and production bonus), was approximately 2s. 10d. a gallon. For 1951-52 this average will be increased by 1½d. a gallon as a result of the annual review and a further ½d. a gallon as a result of the special review. These increases will be applied with a view to encouraging a more level supply of milk and quality production.

During and since the war milk has been given precedence. Now the stage has been reached when sufficient milk is being produced through the year to meet consumers' requirements. Winter milk production is costly and clearly it is the Government's view that it would be wastefully extravagant to push it up higher. There can be no sudden switch from milk to meat production, but the course of expansion is now made clear. To reach the required

increase in home-produced meat still more feeding-stuffs must be grown here. Imported supplies of coarse grains are dear to buy and the supply is uncertain. Every farmer to the utmost of his means must grow part of the ration which his pigs and poultry particularly will need.

The main concern of the veterinary profession in this matter will be to ensure that, so far as lies in its power, this change of emphasis from milk to meat production shall carry with it no concomitant slackening in the vigorous prosecution of Government measures to improve the health of the National herd and to provide a safe milk supply. In this connection reassurance may be gained from the Civil Estimates for Trade, Industry and Transport for 1951-52, published on the same day. While these show a net decrease of £12,366,527 compared with 1950-51, there is an increase of £3,658,131 in the estimate for the Ministry of Agriculture, and this is due principally to the provision of £6,300,000 (compared with £2,500,000 in 1950-51) for head rate bonuses payable to owners of supervised or attested herds under the Tuberculosis (Attested Herds) Scheme, 1950.

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THE R.A.V.C. MUSEUM

In the current issue the Editor of the *Journal of the Royal Army Veterinary Corps* draws attention to the fact that there is a flourishing Corps Museum attached to the Library at Aldershot. "Lofty and of noble proportions, it is the obvious last resting place for certain relics connected with the Corps, with Army veterinary medicine and surgery, and with all aspects of animal management." He adds the following list of items as typical of those which will be welcomed by the Curator, R.A.V.C. Museum, c/o R.A.V.C. Laboratory, Thornhill, Aldershot: Full-dress uniform and mess kits, medals, historical pictures, documents of historical interest, swords, war mementoes, etc., and pathological, etc., specimens.

We trust this reference will supplement usefully the journal's plea for augmenting the museum, which is open to all interested persons, with contributions towards "the wealth of historic material which should rightly be lodged" therein.

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VETERINARY MEDICINES AND PURCHASE TAX

Tax-free "Dispensing Packs"•

It is the policy of a number of manufacturers to supply their veterinary specialities only to registered veterinary surgeons and practitioners, and we are asked to point out that the inclusion of the following wording on their tax-free dispensing packs does not mean that this policy has been changed.

"For Dispensing Only.
Contents to be supplied to the public on prescription only. Supplied free of Purchase Tax solely on this understanding."

• Drugs and medicines consisting of B.P. or B.P. Codex substances which are marketed under a brand name may be supplied free of purchase tax in approved "dispensing packs" subject to certain Customs and Excise regulations, including the requirement that the package must bear the wording indicated.

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AMERICAN METHODS OF BRUCELLOSIS CONTROL

Dr. Birch at the Royal Veterinary College

Dr. R. R. Birch, of the University of Cornell, U.S.A., recently addressed a conference at the Royal Veterinary College, London, on the subject of brucellosis in cattle. Dr. Birch has just concluded a tour of Europe on behalf of O.E.E.C.

Sir Thomas Dalling said that methods used in particular countries must vary according to the needs of those countries. We did not hesitate to use S.19 on adult cattle, but the day might come when we might have to change over to the American method of vaccination of young stock only.

Dr. Birch (reports *The Farmer's Weekly*) said that in a country like Great Britain, where tuberculosis is the major bovine disease, it should be made the first object of attack, but this certainly did not mean paying no attention to contagious abortion.

Several years ago at Cornell they had kept records covering several thousand cow years and had divided the cows up into three groups: those which never got brucellosis, those which were recent reactors, and chronics. They also measured breeding efficiency, considering a cow which calved every 12 months as 100 per cent. efficient. The results showed that clean animals were 87 per cent. efficient, recently infected animals were 54 per cent. efficient, and chronics were 76 per cent. efficient.

Transference of infection from cow to cow via the bull was not very usual. Nobody could diagnose brucellosis without laboratory assistance. If a case was regarded as doubtful by the laboratory worker, then the plan should be to test the animal again and see which way the reaction was going.

Animals aged up to nine months did not often get permanent infection. This had the advantage, claimed by some breeders, that calves could safely be left with their mothers. The age limits of four to eight months for vaccination had been advised because an older animal was more likely to require permanent infection with the organism. The vaccine S.19 mitigated the disease but it still left something to be desired.

In an experiment at Cornell with a vaccinated and an unvaccinated group, all cows being turned into an exposure pen in which the infection was kept going by the purchase of infected cows, about 33 per cent. of the unvaccinated cows did not contract the disease. About half the vaccinated animals eventually got it to the point where they were eliminating the organisms either from the milk or uterine contents. However, abortion did not begin in the vaccinated group until the third or fourth pregnancy and was cut down to about 4 per cent. compared with about 36 per cent. in the unvaccinated group.

The first job in controlling the disease, in America, was to make a test of the whole herd over eight months of age. Then it was important to have a talk with the owner and warn him of expected developments rather than waiting until they materialised.

Usually, in the U.S., one of three general plans was adopted. They were: (1) test and eliminate (this policy was best where there were just a few chronic cases and there had been no recent abortions and when the farmer could manage without replacements); (2) the two-herd system (this was very good where facilities existed); (3) the test and hold plan (all cows were kept in the same barn if necessary, but infected cows were taken elsewhere during calving).

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicate, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Swine Fever:

Derby.—270, Mansfield Road, Hillstown, Chesterfield (Mar. 29th).
Durham.—Redbarns Farm, Wardley, Gateshead (Mar. 27th).
Lanarks.—East Cathkin Farm, Rutherglen (Mar. 24th): Nook Farm, East Kilbride (Mar. 28th).
Lincs (*Lindsey*).—Moat Farm, Caenby (Mar. 29th).
Midlothian.—Vogri Piggery, Gorebridge, Midlothian (Mar. 27th).
Norfolk.—Hill Farm, Redenhall, Harleston (Mar. 24th); Broad Farm, Fleggburgh, Gt. Yarmouth (Mar. 29th); Blue Stable Piggeries, Withersdale, Harleston, Norfolk (Mar. 29th).
Stirling.—Blackmill, Parkburn Road, Kilsyth, Glasgow (Mar. 29th).
Surrey.—Grove Heath Farm, Ripley (Mar. 24th).
Yorks (*E.R.*).—Weighbridge House, Hedon, Hull (Mar. 24th); 8, Adelaide Street, Hull; Little Weighton Road, Skidlev, Hull (Mar. 27th); Sicey Cottage Farm, Thearne, Woodmansey, Beverley (Mar. 29th).
Yorks (*N.R.*).—90, Palsgrave Road, Scarborough (disease at: Piggeries at Rigg's Head, Irton) (Mar. 24th).
Yorks (*W.R.*).—582, Manchester Road. Stockbridge, Sheffield; 361, Broadway, Duncroft, Stainforth (Mar. 27th).

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ROYAL SOCIETY OF EDINBURGH

Address on the Moredun Institute by Dr. Russell Greig

Two features of special interest to our readers marked the meeting of the Royal Society of Edinburgh held on March 6th, apart from the fact that the Duke of Edinburgh was elected an Honorary Fellow of the Society. These were, firstly, that amongst the 25 Fellows elected was Professor William M. Mitchell, B.Sc., M.B., Ch.B. (Edin.), M.R.C.V.S., Principal of the Royal (Dick) Veterinary College, and secondly, that an address by Dr. J. Russell Greig, C.B.E., marked the first occasion on which a veterinarian has addressed the Society on the subject of diseases of animals.

In the course of his speech, which dealt with the history, organisation and work of Moredun Institute, Animal Diseases Research Association, Dr. Russell Greig said that the veterinary profession had long been recognised as a handmaid of agriculture but, like her sister profession, medicine, her services, until comparatively recently, had been based on knowledge acquired by long experience derived from trial and error, as distinct from planned experiment based on scientific principles.

The losses which British agriculture annually suffered from dis-

cases of farm livestock had been stated recently to be of the order of £30,000,000. This was a serious burden on any industry and, economic considerations apart, it involved much suffering to animals. . . . The first world war caused a marked rise in the market values of farm livestock, which, in turn, emphasised the seriousness of the losses from animal disease. Hence the realisation that organised Veterinary Research—which had hitherto been almost completely neglected and almost without State financial aid—should be encouraged.

"It was obvious, of course (Professor Greig continued), that considerable sums of money would need to be found—and a number of Scottish farmers undertook to find it—if the cost had to be borne by the industry itself. So these farmers formed a representative committee, which was joined by delegates from the great Scottish Agricultural Associations—the Highland Society, the Scottish Chamber of Agriculture and the Farmers' Union of Scotland. After several conferences this Committee drafted a constitution for an Animal Diseases Research Association. At their first meeting Sir Robert Greig, Chairman of the then Board of Agriculture for Scotland, undertook to press the Development Commissioners to give the Association a full measure of financial support. And so it was that the needs of Veterinary Research in Scotland at last received recognition from a Government Department.

"In the autumn of 1921 the necessary capital and maintenance grants were forthcoming, and in the spring of the following year (1922) the first investigators—the late Professor Gaiger (then Principal of the Glasgow Veterinary College) and Professor Sir Thomas Dalling, now Chief Veterinary Officer to the Ministry of Agriculture—were appointed.

"Gaiger was perhaps the real inspirer of the project and his original conception of the immediate needs of the work was a very modest one. He visualised at first a few acres of pasture land and a lean-to wooden hut to serve as a laboratory.

"At first the research staff were housed in two small rooms in the Glasgow Veterinary College; that was, of course, a temporary arrangement because it was early recognised that the scope of the work demanded not only more extensive laboratory accommodation than was available there but also the provision of animal houses and pasturage. Accordingly the Association, with the aid of Government grants, purchased land at Moredun on the southern outskirts of Edinburgh and built laboratories which they eventually occupied on June 1st, 1926. These buildings have been from time to time considerably extended. Professor Gaiger was succeeded as Director in April, 1926, by Mr. W. A. Pool, who was succeeded, in turn, by myself in January, 1930.

"The Research organisation comprises three divisions:—

1. *General Pathology and Bacteriology*, under Dr. A. D. McEwen with two research officer assistants.
2. *Physiological Biochemistry*, under Dr. James Stewart with two officer assistants.
3. *Virus Diseases*, under Dr. D. R. Wilson with one officer assistant.

"There are eleven technical assistants, five clerical assistants, four animal attendants and a General Secretary.

"The Institute issues certain biological agents which have been evolved during the course of its researches. I need hardly mention that when a specific vaccine or serum has been evolved the data are published in the scientific journals and can be made use of by anyone—including, of course, commercial firms—but the direct issue of such products by the Institute has the advantage of keeping us in intimate touch with the practical farmer, whose collaboration in field work has been of very great value. In 1950 I find that in respect of three diseases, lamb dysentery, louping-ill and braxy, the number of doses of preventive vaccines and sera issued by the Institute amounted to approximately 400,000.

"The financial arrangements of the Animal Diseases Research Association are interesting if only because, I believe, with the exception of one other research body (the Scottish Society for Research in Plant Breeding), they are unique in this country.

"The Association has a membership of approximately 1,600. All the members are farmers or others who are interested in the welfare of livestock, and the annual maintenance expenditure of the Institute is met from:—

"(*a*) A '*Local Income*' comprising members' subscriptions, donations from private individuals, county councils, city corporations, agricultural bodies, business firms; interest derived from endowments, etc., and income obtained from the sale of biological products.

"(*b*) A *Block Maintenance Grant* received from the Department of Agriculture.

"I shall not trouble you with the recitation of figures but it may be mentioned that during the recent financial year the Institute's expenditure was roughly £28,000, which was met by our raising as local income about £7,000, leaving £21,000 to be found from Government sources, *i.e.*, practically one-fourth of the annual expenditure was raised from A.D.R.A.'s own resources.

"The directors of the Association are elected by the members and from the directors are elected a Finance and General Purposes Committee who represent also various bodies, including the Department of Agriculture for Scotland, and who act as the Governing Body under the President, Mr. G. G. Mercer. Then there is also appointed a small Scientific Group, under the chairmanship of Professor T. J. Mackie. These gentlemen act as a consultative and advisory body with whom the Director of the Institute, when necessary, can make intimate contact.

"The research programmes are under the general supervision of the Agricultural Research Council.

"From its inception the work of Moredun Institute has been very largely directed to the investigation of definite problems of specific disease—especially those of major economic importance to Scottish flockmasters (although research of a fundamental nature has also received attention)—and the primary aim and object of the work is to discover rational means for the prevention and cure of these diseases. This approach to the problems of animal disease by the method of applied research was not new, indeed it has been followed from early times in the case of veterinary medicine. The trouble in the past lay in the fact that there was so little established knowledge to apply. In Scotland our recorded observations of disease in the sheep really began with the writings of James Hogg, the Ettrick Shepherd (1807). Hogg was a very acute observer on all matters concerning sheep husbandry. But while these and later attempts were made to determine the nature of the scourges afflicting our Scottish herds and flocks, only in comparatively recent times have the sciences of bacteriology, pathology, helminthology and biochemistry rapidly developed. It is principally upon these that modern veterinary research is based."

Dr. Russell Greig then discussed with the aid of lantern illustrations the research histories of several disease problems and summarised the remarkable advances in our knowledge of the diseases of sheep achieved by veterinary science during the last 25 years.

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GUIDE DOGS OF THE BLIND

Members of the profession, by ready adoption of the recommendations made through their Divisions of the N.V.M.A., that free treatment and, if desired by the owner, periodic inspections, should be afforded the guide dogs of the blind, are rendering support to the G.D.B.A. in a measure to which that Association has paid a warm tribute, in correspondence laid before Council.

Our readers, therefore, will be glad to learn that the Association, in its recently issued annual report, is able to announce that the Leamington dog-training centre has been supplemented by a second centre at Exeter. Training of the dogs and their owners—for the two must be taught to work as one—is neither easy nor inexpensive. It costs £180 to train the unit of owner and dog. The new centre needs a capital expenditure of £25,000, and The Guide Dogs for the Blind Association, entirely supported by voluntary contributions, must double its annual revenue to cover the extra upkeep: subscriptions will be welcomed by the Secretary at 81, Piccadilly, London, W.1.

It is of interest to note that the value of the activities of the Association is stressed by the Working Party on the Employment of Blind Persons in its report for 1951, which states "We consider that the possession of Guide Dogs has helped a number of blind persons in their employment and we therefore welcome the fact that the number of dogs trained each year is likely to be steadily increased over the next few years."

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BREAKDOWN IN STUDENTS

"The examination syllabus, the discovery that a brain well respected at school may after all be second-rate, and the concurrent flowering of the sexual instinct, combine to press hardly on undergraduates; and they seldom confide their difficulties to anyone but a friend in like case. This state of stress is reflected in the figures given by Dr. Parnell," observes the *Lancet* in its issue of March 31st, "for mortality and prolonged illness among Oxford undergraduates, and in the American studies he quotes." [Dr. Parnell is Physician in charge of the Student Health Service, Institute of Social Medicine, Oxford.] "In his series, mental illness and nervous breakdown accounted for more than half the illness lasting more than a term, and the suicide-rate was significantly higher than that of the civilian population of the same age. Tuberculosis accounted for nearly another quarter of the total illness, though only one undergraduate died of tuberculosis during the investigation. As Dr. Parnell points out, the relative importance

of mental disorder and tuberculosis among students has not so far been generally recognised; and the fact that two-thirds of those who lost a full term's residence because of mental illness and nervous breakdown later returned to continue their university course does not make things much better. He notes the need for more detailed study of the mental health of students and of the means for preventing mental illness among them. As an interim measure, we should surely admit to these young people that this is a period of special stress. If at the start of their course they were clearly warned by their schoolmasters or tutors that they are entering an experience which many find troubling, and if some experienced person—whether doctor, psychiatrist, or college authority—could be mentioned as a recognised adviser to those in difficulties, undergraduates, even if they ignored the proffered help, would not feel that overwhelming shame at failure to reach an intended mark which contributes to many breakdowns."

[Accepting all this, we may hope that the infusion of veterinary blood into the universities stiffens resistance to the nervous debility apparently now prevalent in these seats of learning: in our recollection and current experience our students, with rare exceptions, are made of sterner stuff.—*Editor.*]

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HERD INSTINCT INFLUENCE ON GRAZING BEHAVIOUR

The following note on the above subject appears in the March issue of *Agriculture* (the Ministry's journal):—

"Observations on the grazing habits of dairy cows in New Zealand are reported by John Hancock, Chief Animal Geneticist at the Ruakura Animal Research Station, in the October, 1950, issue of the *Empire Journal of Experimental Agriculture*. One of the points made in this interesting contribution refers to the effect of 'herd law' on animal behaviour. 'A herd pattern, for instance, exists especially in the case of the grazing activity, in that all cows tend, within limits, to begin grazing simultaneously. Partly, at least, this herd pattern is man-made and depends on such factors as the time at which the cows are taken in for milking and allowed out on the pasture, and on the type of sward they are grazing. However, the habit of unison grazing persists, even when the natural behaviour pattern is not interrupted by milking, *i.e.*, when the cows are dry. The factors that determine the exact timing of each cycle are not known. No well-defined leader, for instance, has been noted which would initiate a new cycle. However, that some kind of "herd laws" must determine the behaviour of cows on occasions is shown by the following. A herd of twins was divided into two lots, one of ten sets and the other of seven sets, and were subsequently grazed in adjoining enclosures, separated from each other only by a single wire. The herds were taken simultaneously to and from the milking-shed. It was repeatedly observed that the habits of the two herds were different in that all the animals of one herd could be in the midst of a grazing cycle while the cows in the other herd were all loafing or lying.

"'The inclination to ruminate can be suppressed if most of the other cows continue to graze. It often happens that a few individuals after a short period of idleness in the middle of a grazing cycle begin to ruminate. When, however, the remainder of the herd moves away in search of feed, the ruminating cows tend to follow and, after a few minutes, stop ruminating and begin to graze.

"'The herd instinct is also noticeable in the manner in which all cows tend to be concentrated in a relatively small portion of the enclosure. This inclination is strongest in periods of loafing or lying (especially during the night), but also when grazing it is unusual for cows to be spread over more than a quarter of a big enclosure (10 to 20 acres). In a smaller enclosure the dispersion is relatively greater, but regular herd movements are observable even under these conditions. In a long, narrow enclosure the herd moves from one end to the other, in a squarish enclosure the movement tends to be circular. In warm weather dairy cattle stay closer together than otherwise, possibly in order to make the defence against the increased fly nuisance more effective. Extraordinarily rapid changes in this behaviour have been observed on warm days when periods of direct sunshine alternated with periods of clouds shading the sun. Immediately the sun appeared from behind a cloud the cows gathered together and continued to graze or loaf so closely bunched that one cow touched the other. They dispersed equally suddenly when the sun clouded over.

"'Unusual disturbances, such as straying dogs and passing cattle, frequently result in the simultaneous abandonment of the normal current activities and a wild rush, accompanied by bellowing, is made toward the source of disturbance. After this has passed, all cows, whether they previously grazed or ruminated, tend to graze.'"

CONSUMPTION OF MEAT

Britain the Only Country on Ration

The United Nations Correspondent of *The Times* states that, according to a survey issued on March 28th by the Food and Agricultural Organisation, the country that consumes more meat *per capita* than any other is Uruguay, with 281 lb. a year. Argentina is a good second with 266 lb., and next come Australia and New Zealand, both with an average consumption of 244 lb., and the United States, with 154 lb. The smallest consumption of meat is in Japan.

Although the people of Europe are eating more meat it is expected to be several years before the pre-war level is reached. Canada and the United States, on the other hand, are consuming about 15 per cent. more meat than before the war, America now being a large importer of canned meat from Argentina.

The report points out that the United Kingdom, whose meat consumption in 1949 is given as 99 lb. a head, is the only country now maintaining rationing of fresh meat and bacon, though rising incomes may necessitate a measure of rationing in other countries this year. Had it not been for the stoppage of trade, it is stated, the position of British meat supplies would have been quite favourable last year.

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This year the British Standards movement attains its Golden Jubilee, and as a part of the celebrations an exhibition, supported by practically the whole range of British industry, will be held at the Science Museum, South Kensington, during the two weeks beginning June 18. Britain was the first country to put industrial standardisation on an organised basis nationally through the British Standards Institution. The benefits derived from standards, standardisation, and simplification will be graphically presented, and each industry will show how standards have simplified production, reduced costs, and maintained quality, and how in turn they have benefited the user.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

REACTORS IN ATTESTED HERDS

Sir,—May I be permitted to comment on Mr. Swift's letter in *The Veterinary Record* of the 17th inst. Whilst deploring the state of affairs which results in reactors passing through attested herds sales, most L.V.I.s no doubt will resent his implication that whole-time Inspectors are more competent to undertake the testing of attested herds than are L.V.I.s.

There are many factors accountable for this unfortunate occurrence which should be taken into consideration, and of which the Ministry itself must be well aware, *e.g.*, it is possible that a beast which showed increased measurements at the second visit of a herd test, but passed the test according to the Ministry's formula, may be sold just prior to the next annual herd test, and again sold before the purchaser's annual test becomes due. This beast will therefore have "escaped" two annual tests, and may change hands in this manner several times, thus escaping a corresponding number of tests. What contacts the beast may have made in the meantime is anybody's guess.

This is only one example. There are many others which could be enumerated, but the surprising thing is that they have not occurred to Mr. Swift.

Yours faithfully,

R. L. Lewis.

Bridge Street,
Llanrwst,
N. Wales.
March 26th, 1951.

. . . . . .

Sir,—The letters in your recent issues have brought to light a possibly serious state of affairs which, if it really exists, deserves to be well aired, and so cleared by definite information, which it may be in the power of the Animal Health Division to give.

This is especially required at the present time when so many stockmen are proceeding to attest their herds. The information which may be brought to the notice of the profession by correspondence or circulars might make the life of the practitioner section of the profession easier, in our endeavour to explain to an exasperated stockman that so many more of his herd have reacted.

I feel it all boils down to the question of specific and non-specific infection, and to whether their overlapping allergy can be elucidated and so differentiated more precisely.

I would appreciate informative answers upon the following points:

What percentage of reactors from attested herds have been carefully post-mortemed and proved to be tuberculous? One is given to understand that the Ministry of Agriculture, through the Animal Health Division, can purchase such cases for detailed examination at Weybridge, but whether this has been implemented or not I do not know.

Again, I would like to hear whether contact, direct or indirect, between tuberculous humans and attested cattle actually does cause positive reactions? If this be true, what is the position in herds belonging to sanatoria where contact, indirectly at least, is almost inevitable?

Similarly does the use of human sewerage on attested farms lead to positive reactions. If this supposition be true, what is the position in sewerage farms which may be attested?

With regard to non-specific infection, I would like to know more about the so-called skin tuberculous lesion (S.T.B.), namely, whether or not these lesions are preponderately tuberculous. Furthermore, are there any other clues like S.T.B., Johne's, or high avian readings, which may be regarded as indicative of non-specific infection?

Finally, Sir, I would like to ask whether the allergic phenomenon upon which the intradermal test is based, can be made more definite by the employment of other detectors, at possibly other stages of gestation, to eliminate still further these overlapping allergy reactions.

The above queries are asked not in a destructively critical manner, as I feel I do appreciate the immensity of the problem. The answers may help me to explain the complete absence of macroscopical tuberculosis in a fat cow which gave a reading of 9/20

8/27

Yours faithfully,

286, High Street, Bangor, North Wales
March 22nd, 1951.

ERIC JONES.

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Sir,—We note with amazement the article by R. J. Swift on "Reactors in Attested Herds," appearing in the edition of *The Veterinary Record* dated March 17th, 1951.

Perhaps Mr Swift would be good enough to interpret the second paragraph of his article.

Our interpretation of the above is that he considers the L.V.I. incapable of performing the test satisfactorily and he goes as far as to suggest that the whole-time officers only should do the test of such herds and reactors.

May we remind Mr. Swift that the department responsible for the interpretation of the test is the Divisional Office of the Animal Health Division in the county where the test is undertaken and under control of a Divisional Officer.

The L.V.I. is required only to perform the test and record the measurements, etc. Notification of the results and issuing of licences is entirely in the hands of the aforementioned department and not the responsibility of the L.V.I. as Mr. Swift seems to think.

There are many pitfalls in the test and until such time as there is closer co-operation between the departments concerned these dangers will not be overcome.

A few of these dangers have recently presented themselves in the course of our routine testing.

1. While testing a Red Poll attested herd the only animal which gave an increased swelling was one which was bought at an attested sale on December 8th, 1949, and issued with a licence from the Animal Health Division for a test which took place on January 10th, 1949. The particular animal entered the herd on December 8th, 1949, date of purchase, two months after the official herd test had taken place, and had to wait until November 14th, 1950, when the next official herd test was undertaken, a period of 22 months.

2. A four-month-old calf was purchased at an attested sale and issued with a licence accordingly, but on being tested at its new home the animal was found to have no ear number whatsoever, although an ear number was given on the movement permit.

3. It has also come to our notice that many inconclusive reactors which pass on retest are immediately sold under certificate issued by the Animal Health Division and it is a well-established fact that many of these animals fail when subjected to a future test. Should not a note be made on the certificate issued by the Animal Health Division that the animal in question had previously given an inconclusive reaction? We advise all our clients to sell doubtful reactors if and when they have passed the retest.

Yours faithfully,

1, Brook Street, New Bedford Road, Luton.
March 29th, 1951.

C. R. A. POWELL,
R. A. S. WILSON.

DAIRY HERD INSPECTION

Sir,—The Veterinary Surgeons Act, 1881, defines "Veterinary Surgery" as meaning the art and science of veterinary surgery and medicine.

Circular No. 675 sent to all whole-time Veterinary Officers and Local Veterinary Inspectors (Animal Health Division, March 20th, 1951) indicates that "as a measure of economy, it has been decided to suspend for the time being, veterinary inspections of non-designated (not attested) dairy herds in England and Wales whose milk is known to be adequately heat treated before sold to the consumer."

I suggest the above direction constitutes professional misconduct because it ignores completely the health of the farmer and his family, his servants and their families and more directly the health of the cattle, most particularly the suckling calves and young stock. The general improvement in the health of cattle since regular clinical inspection commenced (the almost complete absence of clinical tuberculosis) can be appreciated only by those who can remember the "wasters" and "screws" of the 1920s.

I submit this is a matter to be dealt with by the Royal College of Veterinary Surgeons as well as the N.V.M.A.

On my side preliminary plans are completed to deal with the matter in a sphere much wider than either of these bodies.

Yours faithfully,

66, Coningsby Road, High Wycombe,
March 27th, 1951.

L. PITCHER.

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ACETONAEMIA

Sir,—Mr. R. J. Garner would appear to suggest that the etiology of "primary" actonaemia is obscure, but if one considers that the "secondary" acetonaemias are caused by traumatic and bacterial agents, then the biological origin of "parturient" acetonaemia must be parturition. The etiologic treatment of "parturient" acetonaemia is then an easy but disastrous matter. The general practitioner, in his daily contact with the etiology and pathogenesis of disease, must, therefore, assert that the important factor in acetonaemia is the pathogenesis. It cannot be suggested too strongly to Mr. Garner that he redirect his efforts in this direction, and he will no doubt find that the practitioner has helped him considerably by assessing the value of various treatments—the aim of which is to alter the pathological state. It is co-operation of this kind that will reveal, ultimately, the full significance of acetonaemia.

It is impossible for the general practitioner to consult the latest text-books in every case, but it appears to have been accepted, since 1937, when Green, Duvan and Seloir demonstrated the presence of β-hydroxybutyric dehydrogenase in animal tissue, that oxidation of β-hydroxybutyric provides both H and energy for the reduction of pyruvate to form lactate. Whether this is accepted by Mr. Garner or not, does not alter the fact that the process of energising the cell is a complicated one, and one deficient link in the chain reaction could give the same end result. This conception would appear to explain the occurrence of acetonaemia in tuberculosis, metritis, traumatic gastritis, and diabetes. Any contribution to the elucidation of the pathogenesis of this condition, reaches, therefore, beyond *post-partum* acetonaemia.

Yours faithfully,

c/o Castle and Leason, Black Horse Lane, Ipswich.
March 25th, 1951.

J. CASSELLS.

* * * * *

SUSPECTED BRACKEN POISONING

Sir,—With reference to the clinical communication on bracken poisoning in your issue of March 31st, a case showing symptoms identical to those described was treated in conjunction with Mr. W. Tait, M.R.C.V.S., in Aberdeen. The use of Anthisan M. & B. gave a recovery of spectacular speed. There was only one case, though several heifers had fed on a pasture where bracken was more plentiful than grass.

Yours faithfully,

Grove End House, Wem, Salop.
March 31st, 1951.

D. H. MONAGHAN.

* * * * *

MY EXPERIENCE WITH ETHYL CHLORIDE (B.P.)

Sir,—Ethyl chloride vapour as an anaesthetic is being used extensively as a short-acting safe anaesthetic in medical work, whereas surprisingly little is being heard of it in veterinary anaesthesia.

Obviously the search for a new anaesthetic should be made only when there is need for it and the selection made after extensive trials, and establishment beyond doubt that the new is better than the old in its efficiency, simplicity and low toxicity. Thus the

general utility of such a substance should not be conditional and cramped on account of the need for special skill or elaborate equipment suitable only as theatrical decoration.

The ordinary veterinary surgeon in the field is a surgeon and a physician at the same time. He deals with patients ranging from the rabbit to the rare rhinoceros and with people high and low, rich and poor. Gas cylinders and pumps and masks perhaps are not available very often, or if available are uneconomical. It is for him and particularly for one who has a large cat clientele that ethyl chloride is invaluable.

The cat is most sensitive to the majority of the anaesthetics that are now in use and at the same time is the most irksome of the common animals to handle.

In my surgical practice at Madras, India, I have used ethyl chloride (B.P.) quite extensively and successfully in feline surgery ever since 1947. Before that I am not ashamed to admit that more cats were lost than saved due to faulty anaesthetics than to any other single factor. Incidentally ether and chloroform mixture was the anaesthetic then in vogue.

On coming to this country I find that the only reference made to ethyl chloride anaesthesia was by Mr. Longley in his praiseworthy clinical paper published in *The Veterinary Record*, pp. 152-154, Vol. 62, No. 11, March 18th, 1950.

In my limited observation here I have found that ether and oxygen and carbon dioxide is liberally used with equal success in feline work—but then it means the appropriate equipment.

Ethyl chloride is available at low cost in glass tubes and bottles fitted with spraying screw tops, which are very handy, and its use does not demand any special skill. With a few whiffs of its vapour the cat goes under and in a minute or two is completely relaxed and remains so for about seven minutes. The period could be safely pro'onged with a further spray and thus feline surgery could be made very easy.

I have full confidence in recommending ethyl chloride anaesthesia in the control of cats for diagnostic X-ray work, for examination of the mouth and throat and dental surgery, for ovariotomy and hysterotomy.

As Mr. Longley has pointed out in his paper, it is rather unfortunate that Professor J. G. Wright in his valuable book on Veterinary Anesthesia has made only a passing reference to ethyl chloride as an anaesthetic.

Yours faithfully,

Royal (Dick) Veterinary College, M. N. Menon.
Edinburgh, 3.
March 17th, 1951.

* * * * *

ECONOMICS OF VETERINARY PRACTICE

Sir,—The most casual perusal of a newspaper, daily or weekly, of any shade of political opinion, brings home to the reader that the country's economics are now largely dominated by an inflationary spiral. Some businesses and professions, of course, are better equipped than others to withstand this pressure; but study of my own accounts for the past two or three years, and talks with co leagues, make me doubt if the veterinary profession is one of those in a strong position. In my own case my gross takings are something over double what they were before the war, but my expenses between five and six times. Many veterinary surgeons admit to the existence of an overdraft (some boast of it); in moments of confidence they will mention its size—and the larger the practice, the more assistants, qualified and lay, employed, the larger the overdraft seems to be. While one may take the view that this represents the degree of confidence in the profession held by the banks, the position is not a healthy one. It is at the best prejudicing comfort and security in one's old age, if the proceeds of the sale of one's practice are required by the bank to liquidate an overdraft. It is likely that the expense of running a practice will increase rather than decrease; but the maximum level of fees which farm profits will stand has probably been reached: bank advances to farmers are now nearly four times what they were four years ago, and all published statistics (which usually relate mainly to the better-run and more profitable farms) show that farm profits are running at lower levels year by year. It will be an experience common to all those engaged in agricultural practice that debts are increasingly hard to collect, that there is a larger and larger proportion of long-standing accounts on the books.

There may not be much difference between a pessimist and a realist: wishing to be the latter, I can envisage a point at which our usefulness to the community will be endangered by the threat of economic extinction. This, apart from the personal tragedies involved, would be a national disaster, and I feel that the position needs the most careful consideration at the highest levels, if we are to avoid both financial hardship and the threat of an *imposed* National Health Service for Animals. If the latter should, through economic stress, become necessary, it is far better to be forewarned and forearmed with a well-considered scheme as a basis for negotiation and agreement.

Yours faithfully,

Chipping Norton, Oxon. Paul Crosfield.
March 26th, 1951.

* * * * *

NOMENCLATURE OF ANIMAL DISEASES

Sir,—It would be interesting to know what the members of our profession, who wish to abolish the name given to certain diseases and conditions commonly met with in general practice, would substitute for the following, to mention only a few: milk fever, wooden tongue, foul of the foot, foot rot, loin fallen, calf scours, blown or hoven, distemper. No doubt the medical profession would also like to know what they are to substitute for measles, whooping cough, mumps, influenza, etc. We probably know the answers, but what a mouthful for the ordinary layman.

These old and familiar names mean something definite to the practitioner of experience, and I hope and trust they will not be interfered with. They have been in existence before most of us were born and will, I feel sure, still be used after we have passed on.

To teach the student only the scientific names of these conditions, without also informing him of those commonly used, would, in my opinion, be a disaster. I cannot imagine anyone employing an assistant who had never heard of milk fever.

Yours faithfully,

St. Mary's House, R. E. S. Tuckey.
Whitchurch, Shropshire.
March 31st, 1951.

* * * * *

"THE FIRING OF HORSES AND LIVESTOCK INSURANCE"

A Disclaimer

Sir,—I have received a letter from an Irish veterinary surgeon couched in the following terms:—

"Dear Professor Formston,

With reference to an article entitled 'The Firing of Horses and Livestock Insurance' which appeared in *The Veterinary Record*, March 10th, 1951.

I presume that you are the professor mentioned in the article. The context in which the phrase 'Rural Irish horse doctor' appeared can only be regarded as a slur on the Irish Veterinary Profession. The terms 'Horse doctor' and 'Vet' are descriptive terms used synonymously by many lay people in this country to describe veterinary surgeons.

The derogatory remarks which occurred in this letter can only cause resentment over here and it is regrettable that the writer should be guilty of such bad taste.

I trust that this uncomplimentary reference will be retracted in due course.

Yours faithfully,

. . . . . .

March 14th, 1951."

I wish to state that I was not responsible for the remarks referred to in that letter.

Yours faithfully,

Royal Veterinary College and Hospital, C. Formston.
Field Station:
Streatley House,
Streatley,
Berks.
March 20th, 1951.

Advertisers' Announcements

Abbott Laboratories, Ltd., 3, Wadsworth Road, Perivale, Greenford, Middlesex, extend a cordial invitation to all veterinarians to visit their new laboratories at Jarrow-on-Tyne, where vastly improved facilities exist for the production of fine British-made pharmaceutical specialities. A handsomely illustrated brochure gladly will be sent on request.

Oxo, Ltd., Thames House, Queen Street Place, London, E.C.4, announce that, following their successful introduction of 'Oxoid' Culture Media in tablets and granules, they have produced a Culture Media handbook in loose-leaf form. The amount of information this contains in the way of formulae, directions and notes on uses makes it of great interest to bacteriologists and laboratory technicians. As fresh information becomes available, or new preparations are introduced, additional pages are promptly sent out, so that the holder of each handbook is kept completely up to date with the latest developments. Applications are invited from those interested for this handy and substantially produced publication.

N.V.M.A. CONGRESS, 1951

Provisional Programme

Congress Meetings will be held in the Floral Hall, Winter Garden, Eastbourne

Sunday, September 23rd

EVENING : 8.0. Reception by South-Eastern Counties and Sussex Divisions.

Monday, September 24th

MORNING : 10.0. Civic Opening of Congress by His Worship the Mayor of Eastbourne.
10.30. Opening of Exhibition of Surgical Instruments, Drugs, etc., by the President, N.V.M.A.
11.30. Sectional Meetings.

AFTERNOON : 2.30. *Address* : " Control of Diseases of Livestock : a comparison of methods in different countries and their significance," by Sir Thomas Dalling, M.A., M.R.C.V.S., F.R.S.E., Chief Veterinary Officer, Ministry of Agriculture, followed by an address on the same subject by Dr. L. P. de Vries, Secretary, Animal Health Service, The Hague, Holland ; and also by an American contributor.

EVENING : 8.30. Civic Reception, Dance and Cabaret, given by the Mayor and Mayoress of Eastbourne, at the Winter Garden, Devonshire Park, Eastbourne.

Tuesday, September 25th

MORNING : 9.30. *Paper* : " Johne's Disease, its Diagnosis and Control," by Dr. A. W. Taylor, M.R.C.V.S., of Compton. Opener : Mr. H. T. Matthews, B.V.SC., F.R.C.V.S., D.V.H.

AFTERNOON : 2.30. Small Animal Surgery, including X-rays, in the Gas Theatre, Eastbourne.
Ladies' Excursion.

EVENING : 8.30. Reception and Dance given by the President, N.V.M.A. at the Grand Hotel, Eastbourne.

Wednesday, September 26th

MORNING : 9.30. *Paper* : " The Application of Genetics to the Breeding of Farm Livestock," by Professor M. M. Cooper, Wye. Opener : Professor Wm. C. Miller, M.R.C.V.S., F.R.S.E.
12.0. Last meeting of Council 1950/51.

AFTERNOON : 2.30. Congress Photograph.
3.0. Annual General Meeting.

EVENING : 7.30 for 8.0. Annual Banquet, at the Grand Hotel.

Thursday, September 27th

MORNING : 9.30. *Paper* : " Contagious Canine Hepatitis," by Mr. H. B. Parry, B.A., M.R.C.V.S. Opener :

AFTERNOON : Free for Golf, Tennis, etc.

EVENING : 8.30. Ladies' Guild Dance, at the Grand Hotel, Eastbourne.

Friday, September 28th

MORNING : 9.30. *Paper* : " Parasitic Broncho-pneumonia in Cattle," by Dr. E. L. Taylor, M.R.C.V.S., D.V.H., of Weybridge. Opener : Mr. J. W. Bruford, M.R.C.V.S.

AFTERNOON : 2.30. Large-animal Surgery Demonstrations at the Wellcome Veterinary Research Station, Frant, Nr. Tunbridge Wells.

1. Films—shown by Mr. J. McLintock, M.R.C.V.S.
2. Rumenotomy—by Mr. K. Stuart, M.R.C.V.S.
3. Demonstration of Italian Instrument for the Removal of Foreign Bodies from the Cow—by a representative of an Italian firm.
4. Dishorning—various methods to be demonstrated.

Demonstration of Certain Methods for the Evaluation of Bull Semen—by Mr. J. L. Hancock, M.V.SC., M.R.C.V.S.

Ladies also invited to visit Frant, where special arrangements will be made for their entertainment.

EVENING : Dance given by the Grand Hotel.

Saturday, September 29th

MORNING : 10.0. Closing Meeting of the Congress, followed by
First Meeting of 1951/52 Council, N.V.M.A.

N.V.M.A. CONGRESS, 1951

September 23rd - 29th (inclusive)

List of Hotels in Eastbourne

The following is a list of recommended hotels in Eastbourne, giving particulars of their charges, etc. Members are advised to make reservations *as soon as possible* direct to the hotel of choice. Should a fuller list or any other information about Eastbourne be required, this can be obtained on application to the Publicity Department, Information Bureau, Eastbourne (Tel.: 4848).

The headquarters hotel for the period of the Congress and at which most of the evening functions will be held, is the Grand Hotel, Grand Parade, and block reservations of double and single rooms have been made there by the Association. These reservations will be held until the end of July *only*.*

Recommended Hotels in Eastbourne in the vicinity of the Conference Hall (the Winter Gardens) and the Headquarters Hotel

Name and Address	*Inclusive*	† *Bed and breakfast*
Licensed		
Grand Hotel, Grand Parade	36/- to 55/- per day	29/- to 47/6
Cavendish, Grand P'de	35/- to 60/- per day	30/- to 35/-
Imperial, Devonshire Place	7 to 11 gns.	—
Hydro, Mount Road	8 to 12 gns.	—
Kenilworth Court, Wilmington Square	From 7 gns.	17/6
Sea View, Grand Parade	8 to 10 gns.	—
Beaulieu, Grand Parade	8½ to 10 gns.	—
Sandhurst, Grand P'de	From 25/- per day	—
Southdown, Howard Square	7 to 11 gns.	—
Neptune Court, Jevington Gardens	5 to 8½ gns.	15/6
Clarendon, Gildredge Road	7 to 8½ gns.	—
Sussex, Cornfield Terrace	9 gns.	17/6
Clifton, South Street	7 to 10 gns.	—
Hotels and Private Hotels		
Lansdowne, Grand Parade	7½ to 11 gns.	19/6
Haddon Hall, Devonshire Place	7 to 10 gns.	—
West Rocks, Grand Parade	6 to 10 gns.	—
Wish Tower, Grand Parade	7 to 10½ gns.	21/-
Queensborough, Grand Parade	7 to 10 gns.	15/6
Oban, Grand Parade	7 to 10 gns.	—
New Wilmington, Compton Street	7 to 9 gns.	18/6
Quendon, Carlisle Road	6 to 7½ gns.	—
Lynwood, Jevington Gardens	4½ to 7½ gns.	—
Lamont, Wilmington Square	7½ to 9 gns.	—
Caithness, Wilmington Square	7 to 9 gns.	—
South Cliff, South Cliff	6 to 8½ gns.	13/6
Shirley Court, Hardwick Road	6 to 8 gns.	—
Lathom House, Howard Square	6 to 8½ gns.	15/6
Stanley House, Howard Square	7 to 10 gns.	15/6
Whitehall, Howard Square	6 to 9 gns.	—
Ben Reay, Carlisle Road	6 to 8 gns.	—
Marden, Carlisle Road	6 to 7½ gns.	—
Medwyn Court, Carlisle Road	5½ to 6½ gns.	—
Southborough, Carlisle Road	5½ to 7 gns.	—
Alwyn, Jevington G'dns	6 to 7 gns.	—
Brooklyn, Jevington Gardens	7 to 8 gns.	—
Candar, Jevington G'dns	5 to 6½ gns.	—
The Chimes, Jevington Gardens	5½ to 6½ gns.	—
Elmscroft, Jevington Gardens	5 to 5½ gns.	—
Fairlands, Jevington Gardens	5 to 6½ gns.	—
Hazelhome, Jevington Gardens	From 5½ gns.	—
Jevington Guest House, Jevington Gardens	5 to 6 gns.	—
Kuvee, Jevington Gdns.	From 4½ gns.	—
Little Seeleys, Jevington Gardens	5 to 7 gns.	—
Morningside, Jevington Gardens	From 5½ gns.	—
Rosforde, Jevington Gardens	5 to 5½ gns.	—
Springhaven, Jevington Gardens	5 to 6½ gns.	—
Sussex Guest House, Jevington Gardens	4½ to 6 gns.	—
Tor View, Jevington Gardens	5½ to 6½ gns.	—
East Mullion, Lascelles Terrace	7 to 9 gns.	—
Mowbray, Lascelles Terrace	5 to 7 gns.	—
Revelstoke, Lascelles Terrace	6½ to 7½ gns.	—
South Lynn, Lascelles Terrace	5½ to 6½ gns.	—
Edenhurst, Wilmington Gardens	5½ to 7 gns.	12/6
Farrars, Wilmington Gardens	5 to 6½ gns.	—
Kingscourt, Wilmington Gardens	5 to 7 gns.	12/6
Park View, Wilmington Gardens	5 to 6½ gns.	—
Travancore, Wilmington Gardens	5 to 6½ gns.	—
Devonshire Court, Wilmington Square	5 to 7 gns.	—
Ellesmere, Wilmington Square	5 to 7 gns.	—
Faircroft, Wilmington Square	6 to 8 gns.	—
Southview, Wilmington Square	6 gns.	—
Country Accommodation		
Birling Gap Hotel, Birling Gap, East Dean	8 gns.	
Woodside, Hailsham	From 6 gns.	
Glyndley Manor, Hankham, Hailsham	From 8 gns.	
Chalk Farm, Willingdon, Hampden Park	From 6 gns.	
Martlets, Pevensey Park Road, Pevensey	5 to 5½ gns.	

* In booking at the Grand Hotel, if attendance at the N.V.M.A. Congress is mentioned, special terms will be allowed.

† The hotels indicated offer bed-and-breakfast accommodation at the terms quoted, but only for odd nights and not for full week bookings.